Federal-Provincial Examination of Telecommunications Pricing and the Universal Availability of Affordable Telephone Service

WORKING PAPERS

October 1986

Minister of Supply and Services Canada 1986
Catalogue nº Co22-72/2-1986-E
ISBN 0-662-15083-X

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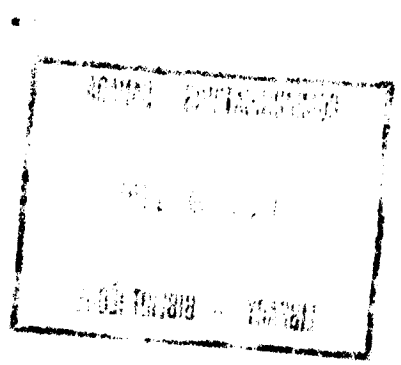

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CHAPTER 1

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1.1 Introduction

In January 1986, at the request of federal and provincial Ministers of Communications, Canadian telecommunication regulators and, in some cases, provincial officials, began an extensive examination of Canadian telecommunications pricing and universal availability of affordable telephone service. The purpose of this chapter is to provide background information concerning the conduct of the examination and the present telecommunications environment in Canada. The information contained herein is intended to provide a context for the examination and to be a source of general information for the more specific aspects of its work.

The document is divided into four main sections: first, a discussion of the organization and functioning of the examination; second, an overview of the telecommunications environment in which the examination was initiated; third, a description of the Canadian telecommunications industry, the telecommunication companies, their services and selected financial statistics; and fourth, a description of the Canadian telecommunications regulatory structure, including key regulatory practices in each regulatory agency.

1.2 Organization and Functioning of the Examination

1.2.1 Origins of the Examination

In a letter dated 20 December 1985, the federal Deputy Minister of Communications requested the Chairman of the Canadian Radio-television and Telecommunications Commission (CRTC) to take the initiative in calling the first organizational meeting of the examination. This request followed earlier discussions between federal and provincial officials and exchanges of correspondence among Ministers responsible for Communications regarding the conduct and the mandate of the proposed investigation.

1.2.2 Terms of Reference

The mandate for the examination was contained in the Terms of Reference attached to the December 20 letter. They included the following context for the required work:

> In view of industry proposals, consumer concerns and regulatory initiatives with respect to the pricing of telecommunications services in Canada, federal and provincial Ministers of Communications have agreed on the need to address jointly the fundamental policy questions raised by the pricing issue on a national basis, specifically its possible effects on the objective of universal availability of basic telephone service.

Accordingly, Ministers requested federal and provincial representatives to prepare a report for their consideration which:

a) Analyses current rating practices and principles used to establish the price to the consumer of telecommunication services, assessing advantages and disadvantages in terms of:

- maintaining universal availability of affordable telephone service;
- fostering effective use of the public telecommunications network;
- avoiding uneconomic bypass;
- facilitating cost-effective business communications, and encouraging technological and service innovation; and
- contributing to overall economic efficiency; and

b) Identifies a range of possible alternative rating structures; analyses their potential positive and negative impacts on the various categories of telephone subscribers in all areas of Canada in terms of the considerations in (a) above; and explores possible means of alleviating the adverse effects of current and alternative pricing systems.

1.2.3 Structure of the Examination

Ministers indicated that the examination should proceed with federal and provincial representation from telecommunications regulatory authorities and, in the case of some provinces, from designated officials with appropriate expertise in the telecommunications industry. Consequently, membership on the examination was composed as follows:

- M. J.-P. Mongeau
  Commissioner, CRTC
  (Chairman of the Examination)

- Mr. J.A.G. MacDonald
  Chairman
  Newfoundland Board of Commissioners
  of Public Utilities

- Mr. J.S. Drury
  Chairman
  Nova Scotia Board of Commissioners
  of Public Utilities

- Mr. R. O'Rourke
  Chairman
  Prince Edward Island Public
  Utilities Commission

- Mr. D.C. Nicholson
  Chairman
  New Brunswick Board of Commissioners
  of Public Utilities

- M. J.-M. Tremblay
  Président
  Régie des services publics du Québec

- M. J.-M. Demers
  Régisseur
  Régie des services publics du Québec

- Mr. E. Tappenden
  Director, Telecommunications Branch
  Ministry of Transportation and Communications
  Government of Ontario

- Mr. C. Feaver
  Senior Policy Adviser
  Telecommunications Policy Office
  Government of Manitoba

- Mr. D. Smith
  Associate Deputy Minister
  Saskatchewan Telephones
  Government of Saskatchewan

- Mr. A. Ackroyd
  Chairman
  Alberta Public Utilities Board

- Mr. A. Jah
  Member of the Board
  Alberta Public Utilities Board

- Mr. J. Bogyo
  Director, Major Energy Project Review
  British Columbia Utilities Commission

In general, members were supported by staff members from their respective organizations in the detailed consideration of the subject matter of the examination. As required, consultants were retained for specific activities throughout the course of the examination. In particular, Dr. Thomas B. Grandy, Telecommunications Consultant, was engaged to provide assistance in the organization, drafting and editing of various Working Papers and the Report to Ministers. Ms. Brownlee Thomas was engaged to provide technical editing assistance. The work of other consultants is detailed, as appropriate, throughout the report.

At the outset, three Working Groups were established to gather information and report on three key issue areas:

- Working Group 1 - Local Rates

  Chairman: M. J.-M. Demers
  Régie des services publics du Québec

- Working Group 2 - Long-Distance Rates

  Chairman: Mr. A. Jah
  Alberta Public Utilities Board

- Working Group 3 - Local/Long-Distance Relationship

  Co-Chairmen: Mr. C. Feaver
  Government of Manitoba

  Mr. D. Smith
  Government of Saskatchewan.

The first Working Group focussed on local rating practices and principles, assessed them with regard to the criteria set out in the Terms of Reference, and identified and analysed alternative local rate structures as well as possible means of alleviating the adverse effects of current and alternative rating systems. The second Working Group carried out similar activities with regard to long-distance rates. The third Working Group assessed the present and possible future inter-relationships between local and long-distance services, and reviewed these relationships with regard to the five criteria.

1.2.4 Schedule and Key Activities

Ministers requested that regulators report their findings no later than 30 September 1986. Accordingly, plenary meetings of all members were held in early January and February to organize the activities of the examination. A two-stage work plan was developed: The first stage, running until the end of May 1986, involved the collection and analysis of information and data from members and their regulated telephone companies, and the preparation of reports by the Working Groups. The second stage, following immediately thereon, involved the consolidation of the reports of the Working Groups and the preparation of the Report to Ministers.

Two main information-gathering activities formed an integral part of the examination. The first focussed on obtaining the General Tariffs of the major telephone companies, together with preliminary information regarding telephone service pricing. The second, related to the activities of the Working Groups, consisted of detailed information requests to and responses from the major telephone companies concerning telephone service pricing, extensive searching of the literature and members' files and commissioning a variety of consulting reports.

1.2.5 Overall Thrust of the Examination

In undertaking this study, Ministers stated in the Terms of Reference that they were seeking information that could be used by governments to establish public policies relating to the structure of the telecommunications industry. They also stated that they believe this process creates a unique opportunity to collect and review data made available by telecommunication carriers across Canada, and that it would provide an expert and objective outline of the implications of existing pricing arrangements and possible alternatives.

In work pertaining to the examination, members confined their activities to the collection and review of information and the provision of objective analyses of existing pricing arrangements and possible alternatives. In this respect, members felt that their principal role was an analytical and advisory one which could contribute to the policy-making role of Ministers. The approach followed was considered not to fetter the individual quasi-judicial regulatory discretion of regulators participating in the examination. Thus, rather than

recommending policy options, the work of the examination was oriented towards providing governments with a common base of information upon which to discuss and determine policies concerning telecommunications pricing and the universal availability of affordable telephone service. This understanding of the mandate of the examination enhanced its functioning and facilitated participation and discussion.

1.3 Environmental Context of the Examination

1.3.1 Historical Policy and Regulatory Environment

Until well into the 1970s, Canadian telephone companies operated within a relatively stable telecommunications policy and regulatory environment. They were virtual monopoly providers of telephone service in a largely non-competitive and regulated environment. Telephone companies, regulators and governments worked within a framework of price and rate-of-return regulation to achieve the mutually agreed upon objective of universal availability of telephone service at just and reasonable rates and at acceptable levels of quality. As a result, almost all Canadians now have access to telephone service at affordable rates.

The predominant characteristics of this pattern of policy and regulation were described by Woodrow and Woodside in a document prepared for a conference sponsored by the Institute for Research on Public Policy, as follows:

- Telephone companies came to be treated as "natural monopolies" within their given areas of operation as a result of the enormous economies of scale, scope, and of technological innovation involved in the provision of local and long distance service. Natural monopoly conditions are said to exist when one firm can reasonably service an entire market more efficiently than several competing firms, thereby avoiding an unnecessary duplication of facilities and providing service at equal or lower cost.

- Because of the tendency of all monopolies to overcharge and underserve, the telephone companies need to be regulated by government in "the public interest" both to prevent the use of monopoly practices as well as to achieve specific social or national objectives.

- Of particular importance among these and national social objectives are the goal of "universality" and a rough "equality of service" across the country, allowing for widespread access to the public-switched network on the part of as many potential residential and business users as possible, and these goals came to be shared in equal measure both by regulators and telephone companies alike.

- Telephone company pricing under regulated monopoly conditions was designed to make access to the network attractive and tended to follow "value-of-service" rather than "cost-of-service" pricing principles and to be applied on a "system-wide, flat-rate, and route-averaged" basis.

- The overall design of the rate structure has aimed to meet an overall "revenue requirement" which would guarantee a satisfactory rate of return to the telephone companies sufficient to allow it to recover the costs of its investment as well as to make a profit that would satisfy its owners, whether they be private shareholders, governments or some mix of the two.

- The provision of long distance as well as local service generated a complex system of "cross-subsidization" whereby business customers allegedly subsidize residential customers, urban subscribers subsidize rural subscribers and, most importantly, long distance telephone service is used to support local telephone service.

- The common interests and non-competitive relationship among the telephone companies themselves facilitated a successful on-going resolution of inter-company differences through a form of "private sector cooperative federalism" which allowed for the use of separate company facilities and settled revenue claims in the case of network usage by three or more companies.

- All of this took place within a generally "depoliticized" environment where the role played by government in telecommunications regulation tended to be a passive one, jurisdictional conflict between federal and provincial governments was largely absent, and government-industry relationships were minimal and generally harmonious.

The net result was a highly stable pattern of telecommunications policy and regulation which existed for most of this century and where government, regulators, users and the industry itself evinced little desire for change.[1]

While Woodrow and Woodside accurately reflect the general environment, there is debate concerning the existence of cross-subsidization. That debate has its roots in assumptions regarding the costs of providing service about which, as will be discussed later in this paper, there is no consensus.

1.3.2 Pressures to Change or Maintain the Status Quo

In recent years, significant changes in the telecommunications environment have led to increased discussion of the desirability of existing pricing arrangements. Changes in technology within the industry, the convergence of telecommunications and computer technologies, and increased competition in Canada and elsewhere have raised questions concerning the structure of the industry and the pricing arrangements that have been adopted.

Significant growth in telecommunications usage and the success of the telephone companies over the past several decades has long made the telephone business appear to be an area of profitable entry. In addition, the alleged wide margins between revenues and costs in long-distance services, particularly in markets of high activity, signal a large profit potential. Despite attempts to change the monopoly position of the telephone companies, however, entry has been restricted for policy and regulatory reasons.

In recent years, technological change has led to new arguments for more open entry. Technological change within the industry has had two main aspects: improvements in the traditional switching and transmission components of network elements, and the adoption of computer technologies. Satellites, fibre optics, coaxial cable, local microwave, digital switching, new options in business communications equipment and telephone sets are all elements of the former. The enhanced capabilities of terminal equipment, digital switching, digital transmission, improved network control and new services have been largely achieved through adoption of the latter.

Effects of technological change on the industry have included significant productivity gains and reduced unit costs. However, rating principles have not for the most part recognized underlying technologies and changing costs and, hence, rates have not always kept pace with them. Furthermore, the technologies of telecommunications are no longer either unique to or under the control and direction of the telecommunication companies. The reduced costs of telecommunications switching and transmission, and the pervasive nature of computer technology -- which is now integral to all areas of telecommunications -- expand the potential for entry into all aspects of the industry, from manufacturing to service provision. The low cost of entry, the diverse capabilities of the technologies and the alleged potential for lower-priced products and services all form part of the arguments for entry.

There have been a number of general consequences of these technological developments for the telecommunications industry. First of all, they make possible greater competition in the provision of telecommunication products and services (some of which can already been seen in the Canadian environment). Second, they blur traditional industry boundaries, particularly those between telecommunications and information processing. Third, they raise expectations in the minds of users (especially large business) for pricing changes that reflect usage of the new technologies. Finally, they raise the possibility that users will avail themselves of alternatives provided by entities other than the regulated companies to complete some or all of their telecommunications requirements -- i.e. bypassing the established telecommunications industry.

Change in the telecommunications environment has been far more profound in the United States than in Canada. The Federal Communications Commission (FCC) and the courts in that country have been moving for more than two decades towards increased competition. This has been particularly supported in recent years by the ideological orientation of the Reagan administration which favours competition in many aspects of the economy. Significant US regulatory decisions include those regarding terminal attachment, competition in private lines, the Computer I and II decisions establishing distinctions between "basic" and "enhanced" services, competition in inter-state telecommunication services as well as the court-ordered divestiture by AT&T of the Bell Operating Companies. The overall effect of these decisions has been to move the US telecommunications industry from a "regulated monopoly" to a mixture of "regulated" and "pure" competition in the provision of telecommunication services. In general, US policy has been to allow entry into practically all areas, including key service areas (e.g. long-distance telephone service). A result of this has been significant rate restructuring brought about, in part, by market forces.

The "demonstration effect" of the US experience has been considerable. The Canadian and US telecommunication systems have always been highly integrated and similar in technological, policy and regulatory terms -- until, that is, recent policy changes in the United States. Customers, entrants and others interested in promoting change point to the US as an example of what can be achieved through increased competition. Others point to a situation of confusion and chaos in the provision of services which those changes have also generated. Consequently, from a Canadian perspective, the US situation cannot yet be judged as either good or bad relative to the Canadian telecommunications environment.

Views differ as to how Canada should respond to pressures for change. Some believe that competition should be permitted in many more aspects of the telecommunications industry and that prices ultimately should be determined by market forces. Others are convinced that the pressures for rate changes, particularly lower message toll service (MTS) and wide area telephone service (WATS) rates, can best be responded to by a "managed" restructuring of rates. Such a managed approach, it is argued, would achieve pricing arrangements acceptable to the Canadian environment without incurring the costs of restructuring the industry associated with increased competition.

Still others oppose any significant change to existing pricing principles and practices or to industry structure. In their view, the Canadian telecommunications system has served its subscribers well under the existing monopoly situation. Indeed, the fact that Canada has one of the world's highest levels of penetration of telephone service proves its capability of providing service at rates affordable to almost everyone in the country. Proponents of maintaining the status quo further argue that effective regulatory measures can be taken to accommodate or restrict competition and to prohibit bypass, thereby ensuring the financial integrity of the domestic system.

1.3.3 Events in Canadian Telecommunications

As a consequence of pressures for competitive entry and the threat of bypass, Bell Canada and British Columbia Telephone, supported by several other telephone companies, have argued that telecommunications service rates should be moved closer to their associated costs -- as defined by these companies. The term "rate rebalancing" has been used by Bell and B.C. Tel to describe this process. Rate rebalancing would, in their view, result in much lower MTS/WATS rates and significantly higher local rates, while maintaining net revenues at existing levels. This matter arose in a proceeding (the Interexchange Competition proceeding) before the CRTC to consider the 1983 application by CNCP Telecommunications for interconnection to the networks of Bell Canada and B.C. Tel in order to enable CNCP to provide competitive public long-distance telephone service.[2]

Both Bell and B.C. Tel relied heavily on a methodology called the "five-way split" to establish costs and revenues in respect of their rate

rebalancing proposals. The five-way split divides costs and revenues among five broad categories: local, long-distance (toll), competitive network, competitive terminal and common. In Telecom Decision CRTC 85-19, the CRTC presented other five-way split results (modified to include a separate access category) in describing the revenue versus cost evidence submitted by Bell Canada and B.C. Tel (see Table 1.1).[3] The main point made by Bell and B.C. Tel was that, for the local and long-distance categories, revenues are in excess of costs, with the surplus of long-distance revenues over costs being the major contributor to the recovery of access costs. An important element of rate rebalancing for Bell and B.C. Tel is the recovery of all access costs -- either from local service revenues or from a separate access revenue category, with an offsetting reduction of costs recovered from MTS revenues. Whether or not access costs would be appropriately recovered in this fashion remains, as discussed in Chapter 8, subject to debate.

In the Interexchange Competition proceeding, the CRTC was not persuaded that the specific rate rebalancing proposals presented by Bell and B.C. Tel were either necessary or desirable. The CRTC did find, however, that a lowering of MTS/WATS rates is necessary to reduce the communication costs experienced by Canadian businesses. It stated that lower rates in these services would have a positive impact on the Canadian economy as a whole and would serve the social function of improving national communications and understanding. The CRTC was also of the opinion that lowering MTS/WATS rates would reduce incentives for economically inefficient entry to the industry, while at the same time creating an environment better suited for competitive entry in the MTS/WATS market should that appear desirable in the future.[4]

The CRTC also stated that a public process to consider issues relating to the reduction of Bell and B.C. Tel MTS/WATS rates would be announced in the future. Recognizing that such rate reductions would have an impact on other jurisdictions within Canada, the CRTC indicated its willingness to initiate or participate in a consultative process with appropriate federal and provincial representatives with a view to ensuring that the implications of these issues for all jurisdictions are taken into account.

TABLE 1.1
Revenue/Cost Information - Bell Canada and B.C. Tel

BELL 1983 FIVE-WAY SPLIT RESULTS
($ millions)

	Local	Long-Distance	Access
Revenues	1 389	1 988	0
Costs	868	626	1 762
Difference	521	1 362	(1 762)

	Competitive Network	Competitive Terminal
Revenues	386	878
Costs	317	834
Difference	69	44

	Common
Revenues	99
Costs	333
Difference	(234)

B.C. TEL 1982 FIVE-WAY SPLIT RESULTS
($ millions)

	Local	Long-Distance	Access
Revenues	249.4	474.2	0
Costs	174.2	169.6	353.8
Difference	75.2	304.6	(353.8)

	Competitive Network	Competitive Terminal
Revenues	95.6	142.5
Costs	45.9	165.4
Difference	49.7	(22.9)

	Common
Revenues	47.7
Costs	100.5
Difference	(52.8)

The CRTC was of the view that action must be taken to ensure that the present situation with regard to MTS/WATS rates does not worsen while the outstanding issues are being resolved. As an interim measure, the CRTC thus indicated its intention to freeze the aggregate level of Bell and B.C. Tel MTS/WATS rates. It noted that adoption of this interim measure would result in real MTS/WATS rates falling at approximately the rate of inflation.[5]

Support for lower MTS/WATS rates through competition and in some cases by rate restructuring, as proposed by the telephone companies, has been expressed by Canadian businesses -- either individually or through organized business groups. Lower long-distance rates, it has been argued, would enhance Canadian business and improve its ability to compete in international markets.

Consumer groups, on the other hand, have generally argued against any changes that would significantly alter the current telecommunications pricing structure. They are particularly concerned about possible changes in local service pricing which, in their view, might threaten the universal availability of basic telephone service. Essentially the same position has been presented in petitions to the federal government, letters to the federal Minister of Communications and in the public press by individuals and organized groups, including some telecommunication unions.

1.4 The Telecommunications Carrier Industry in Canada

1.4.1 Introduction

This section presents an overview of the industry structure, facilities and networks, services and financial position of the major telecommunication companies in Canada. The material included here was selected on the basis of providing a better understanding of the basic structure and operation of the industry as it relates to the pricing issue. Where possible, information is presented on a provincial basis, complementing the section that follows dealing with the regulatory environment.

The Canadian telecommunications carrier industry consists of a mixture of private, governmental and joint private-governmental corporations and organizations. The operational mandate of the over 100 corporations and organizations involved in telecommunication activities in this country varies from serving the needs of a single local area to serving a region of a province, an entire province, more than one province and the whole country. The companies involved provide Canadians with local, intra-provincial, inter-provincial and international telecommunication services, and together they generated in excess of $10 billion in operating revenues in 1984.

1.4.2 Industry Structure

Table 1.2 presents the major telecommunication companies operating in Canada. Of these, there are two national telecommunication systems -- Telecom Canada and CNCP Telecommunications -- and a variety of other companies that provide services to points within Canada, the United States and overseas. Telecom Canada is an association comprised of the largest telephone company operating in each province plus Telesat Canada, the domestic satellite carrier. CNCP is a partnership of the telecommunication divisions of the major railways -- publicly-owned Canadian National Railways and privately-owned Canadian Pacific Ltd. B.C. Rail, operating in British Columbia, provides services analogous to those of CNCP. Teleglobe Canada, a corporation owned by the federal government, provides overseas telecommunication services.

In addition to the companies with Telecom Canada affiliation, there are nearly a hundred other telephone companies operating across Canada. The largest of the non-Telecom Canada companies are also included in Table 1.2. They are: Québec-Téléphone; Télébec Ltée, a subsidiary of Bell Canada operating in Quebec; Northern Telephone and Thunder Bay Telephone, operating in Ontario; 'edmonton telephones', operating in the City of Edmonton; Prince Rupert City Telephones, operating in the City of Prince Rupert in British Columbia; and NorthwesTel and Terra Nova Telecommunications, both of which are owned by Canadian National Railways and operate largely in the North West Territories and Newfoundland, respectively. The remaining telephone companies -- a mixture of provincial, municipal, co-operative and privately-owned companies -- operate primarily in Quebec, Ontario and Saskatchewan, and they represent a very small proportion of total telephone activity.

TABLE 1.2
Major Telecommunication Companies Operating in Canada

Company	Ownership	Type of Corporation	Principal Territory
Newfoundland Telephone	Private	Investor-owned	Newfoundland
Terra Nova Telecommunications	Public	CN-owned	Newfoundland
Island Telephone	Private	Investor-owned	Prince Edward Island
Maritime Telegraph and Telephone	Private	Investor-owned	Nova Scotia
New Brunswick Telephone	Private	Investor-owned	New Brunswick
Bell Canada	Private	Investor-owned	Quebec, Ontario and eastern portion of Northwest Territories
Québec-Téléphone	Private	Investor-owned	Quebec
Télébec	Private	Investor-owned	Quebec
Northern Telephone	Private	Investor-owned	Ontario
Thunder Bay Telecommunications	Public	Municipally-owned	Ontario
Manitoba Telephone System	Public	Provincial Crown Corporation	Manitoba

TABLE 1.2 (Continued)

Company	Ownership	Type of Corporation	Principal Territory
Saskatchewan Telecommunications	Public	Provincial Crown Corporation	Saskatchewan
Alberta Government Telephones	Public	Provincial Crown Corporation	Alberta (except Edmonton)
edmonton telephones	Public	Municipally-owned	Edmonton, Alberta
British Columbia Telephone	Private	Investor-owned	British Columbia
Prince Rupert	Public	Municipally-owned	Prince Rupert, B.C.
B.C. Rail	Private	Investor-owned	British Columbia
NorthwesTel	Public	CN-owned	Western portion of Northwest Territories, Yukon and Northern British Columbia
Telesat Canada	Public/ Private	Govt. of Can/Major Telephone Companies	Canada
CNCP Telecommunications	Public/ Private	CN/investor-owned CP	Canada (except the territories of Terra Nova Tel and NorthwesTel)
Teleglobe Canada	Public	Federal Crown Corp.	Overseas

As a result of the historical development of telecommunication services and investment imperatives, Canada has evolved a mixed private, public and joint private/public telecommunications ownership structure. Notable in this respect are Manitoba Telephone System, Saskatchewan Telecommunications and Alberta Government Telephones which all operate under provincial government ownership; Teleglobe Canada which is owned by the federal government; Telesat Canada which is jointly owned by the federal government and the major telephone companies; and CNCP which is jointly owned by private interests and the federal government. It is also interesting to note that both public and privately-owned companies are members of Telecom Canada. Among others, these two aspects of industry structure have influenced significantly (and will probably continue to do so) the pricing of telecommunication services in Canada.

In addition to the telecommunication companies discussed above, there are over 200 radio common carriers and, recently, a number of cellular radio-telephone companies operating in Canada. They provide various mobile radio, radio-paging and two-way radio telephone services.

Given the important role of Telecom Canada in Canadian telecommunications, explicit discussion of its structure and functioning is warranted. The ten Telecom Canada members are as follows:

- Newfoundland Telephone Company, Ltd.
- The Island Telephone Company, Ltd.
- Maritime Telegraph and Telephone Company, Ltd.
- The New Brunswick Telephone Company, Ltd.
- Bell Canada
- Manitoba Telephone System
- Saskatchewan Telecommunications
- Alberta Government Telephones
- British Columbia Telephone Company and
- Telesat Canada.

In addition, Québec-Téléphone is an associate member.

Telecom Canada co-ordinates the operation of the national telecommunications network of its members, markets products and services nation-wide, and distributes jointly-earned revenues from these services.

It is managed by a board of directors comprised of one senior executive from each of the member companies. These directors, in turn, appoint a full-time president to oversee the operations of Telecom Canada and to ensure that nation-wide and internationally-oriented policies and programs are compatible with the more local directed plans and activities of the individual member companies. Telecom Canada management system requires the board's unanimous agreement on all major decisions. A formalized staff organization, responsible to the president, interacts regularly with a system of committees involving representatives from all member and associate member companies. In this way, the interests of members are represented in both decision-making and operations. The supporting staff organization is located in Ottawa, and it is derived from member and associate member companies which loan their employees to Telecom Canada for two to three years on an annual assigned quota basis.

Telecom Canada has devised a Revenue Settlement Plan to distribute revenues from jointly-provided services. This plan applies to trans-Canada calls involving three or more members, Canada-US calls and Canada-overseas traffic. Revenues from other Telecom Canada services (such as data and program transmission services) are distributed by the same plan.

The three principal steps involved in the settlement processes are: (a) determining revenues available for settlement, (b) determining member company costs reimbursable from revenues available for settlement, and (c) determining member company shares of the revenues remaining after reimbursement of costs from revenues available for settlement.

The determination of revenues available for settlement starts with the reporting of all Telecom Canada originated revenues by the member companies. These represent revenues "billed and collected" by each member company on behalf of all member companies for the joint provision of services. They also include revenues collected by independent telephone companies which interconnect with Telecom Canada members (such as Québec-Téléphone which interconnects with Bell Canada), reduced by negotiated settlements with the independent companies. The total pool of originated revenues is adjusted prior to the distribution among Telecom Canada members by the net effects of settlements with US carriers, overseas carriers and Telesat Canada.

In the provision of services provided by Telecom Canada members, the member companies invest in telephone plant and incur operating expenses. In the order of one-third of Telecom Canada revenues are distributed based on

the recovery of costs assigned to the provision of Telecom Canada services. The remainder are referred to as "contribution revenues" and they are divided among members based on an agreed upon sharing formula contained in the Revenue Settlement Plan.

While the mechanics of the process are quite complex, changes in the long-distance rates of any member may affect the revenues received by other members by: (a) changing the level of revenues subject to settlement, (b) changing the portion of such revenues used to reimburse the costs of other members, and (c) altering the proportion in which contribution revenues are divided among members. In this way, changes to one member's rates alone can affect the revenues of other members and possibly could also create pressures to change the Revenue Settlement Plan.

1.4.3 Carrier Facilities and Networks

The members of Telecom Canada provide a range of facilities for the transmission and switching of local and long-distance telecommunications traffic, including two coast-to-coast microwave relay routes. Telecommunications traffic is also carried on coaxial and fibre optics cable systems and via Telesat Canada's satellites and earth stations. CNCP operates its own national microwave relay system and switching centres, and generally obtains access to customers by leasing local loops from the telephone companies. CNCP has been granted limited interconnection to the local exchange facilities of Bell Canada and B.C. Tel, permitting customers dial access through the telephone network for certain competitive data and private-line voice services. In a somewhat analogous manner, B.C. Rail, which operates a microwave relay system in British Columbia, has been granted interconnection to the B.C. Tel network.

Canada-US telecommunications traffic to and from the systems of Telecom Canada members and CNCP is exchanged with various telecommunication companies in the United States. Agreements and facilities exist for the cross-border exchange of both terrestrial and satellite traffic. Terrestrial traffic is routed through designated border-crossing points in respect of Telecom Canada as well as CNCP systems. Satellite traffic is exchanged pursuant to Letters of Agreement between the Canadian and US governments, and involves the use of each country's satellite systems.

Overseas telecommunications traffic is carried through the facilities of Teleglobe Canada via its international gateway switches, transoceanic cable or

earth stations accessing INTELSAT satellites. Traffic to and from Canadian points is generally carried by Canadian domestic carriers to the gateway switches and thereafter on Teleglobe facilities. Except as an integral part of overseas satellite traffic, Teleglobe is not involved in Canada-US traffic.

Telecom Canada members jointly plan but separately provide the various elements of their national telecommunications system. Interconnection agreements and revenue sharing arrangements exist with regard to the interworking of the various system elements. Non-members of Telecom Canada generally establish interconnection agreements with the Telecom Canada member in the provinces where they operate for the carriage of traffic to and from their respective territories.

1.4.4 Services Provided by Telecommunication Carriers

a) Introduction

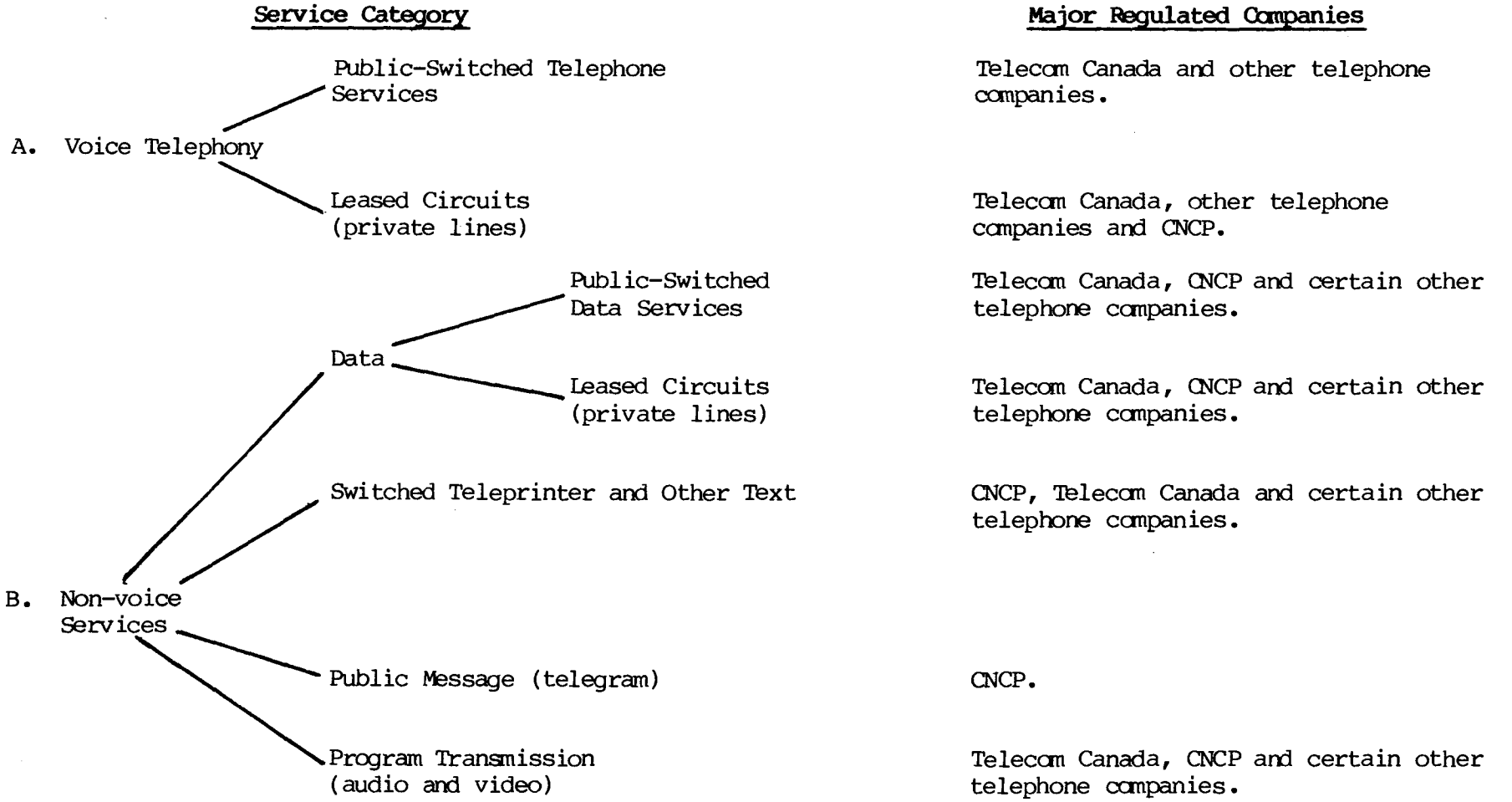
An overview of the services provided by the telecommunications industry is presented in Table 1.3. For the purpose of discussion, the range of services is divided into two broad categories: (a) voice telephony, and (b) non-voice services. Voice telephony, which includes public-switched telephone services and leased circuits, is the area of major telecommunications expenditure for Canadians. It is also the area of primary concern for this examination. Teleglobe Canada is not shown because it generally does not provide service directly to customers but instead interconnects with the telephone companies at its international gateway points.

b) Voice telephony

i) Public-switched telephone services

Public-switched telephone services, generally provided under monopoly conditions, represent the major area of service provision for Canadian telephone companies. These services are grouped under two categories: exchange (local) services (e.g. individual-line and party-line residence and business service, private branch exhange (PBX) trunk service, public telephone service) and interexchange services (long-distance services). The terminal aspects (e.g. telephone sets, inside wiring, PBXs) of local exchange services are no longer provided under monopoly supply by some companies due to recent changes in

TABLE 1.3
Overview of Telecommunication Services



policies and regulations governing the attachment of customer-owned terminal equipment.

Public-switched long-distance voice services continue to be provided on a monopoly basis throughout Canada. Specific service designations under this latter classification include MTS and WATS. MTS includes the various long-distance calling options available to Canadians for calls to non-local points in Canada, and to points in the United States and overseas. WATS includes various bulk-rated long-distance options generally used by business customers. Outward-calling WATS is provided on calls to Canadian points. Inward-calling WATS ("800 Service") is provided both on a Canada-wide and a Canada/US basis.

Most telephone companies in Canada follow similar pricing objectives and principles, and they have adopted comparable rate structures. Hence, local individual-line and party-line residence and business services are generally offered on a flat-rate basis, whereas rates for long-distance services vary with distance, duration, time of day and day of week.

Key objectives that are taken into account in rate setting include: (a) universal availability of affordable telephone service, (b) adequate and stable revenues, (c) an equitable distribution of charges, (d) effective use of the network, and (e) meeting competition. To achieve these objectives, telephone companies have developed two rating principles which are unanimously subscribed to: (1) company-wide rate averaging and (2) value of service.

Company-wide rate averaging means that all customers pay the same price for the same class of service throughout a company's operating territory and regardless of the actual cost of providing service. The value-of-service concept recognizes that telephone services are more valuable to some classes of subscribers than to others. Thus, local flat-rate charges may be higher in locations where there is a larger number of subscribers in the local calling area, and business telephone rates are higher than those for residential subscribers.

Applying these two principles has meant that rates for services do not necessarily reflect costs, except in the aggregate. Costs are taken into account in specific areas, however, by charging more for some services. Thus, operator-assisted long-distance calls are priced higher than direct-dialed calls. Reduced charges for evening, night and weekend service reflect the low incremental cost to the system of such calls, and the fact that such discounts may stimulate increased network utilization and help reduce peak period demand.

In addition, costs are an important aspect of rate setting in areas where competition is a factor in service provision.

ii) Leased circuits

In most regions of Canada, leased voice circuits (private lines), including those for data and program transmission, are readily available on a competitive basis from the telephone companies, CNCP and (in British Columbia) B.C. Rail. Private-line service offerings include foreign-exchange (FX) lines, off-premises extensions and tie trunks. Private lines may be leased on an individual-line or bulk basis. As a result of recent changes to the Telecom Canada Connecting Agreement, approved by the CRTC on an interim basis in 1985 and on a permanent basis in May 1986, Telesat Canada may also provide satellite-based private-line services directly to users. Overseas leased circuits are available by interconnection to Teleglobe facilities at its gateway switches.

c) Non-voice services

Non-voice services have been grouped together for convenience rather than for reasons of similarity in service provision. The major service categories include data, switched teleprinter and other text, public message and program transmission. A description of each of these services is included to provide an understanding of the general portfolio of services offered by Canadian telecommunication companies.

i) Data services

CNCP, Telecom Canada, certain other telephone companies and Teleglobe Canada each provide public-switched data network services. Two of the major competitive service offerings are Infoswitch and Datapac, both of which are interconnected to Teleglobe Canada's Globedat service.

Infoswitch, provided by CNCP, is a nation-wide digital-switched data communications network offering circuit and packet switching facilities to users. Charges for use of the Infoswitch network consist of both access and transmission components. Access charges are fixed monthly amounts directly related to terminal transmission speed, while transmission charges vary with volume more than with distance.

Datapac, provided by Telecom Canada and Québec-Téléphone, is a nation-wide packet-switched public data network. Rates are volume and distnce sensitive. Excluding charges for installation and optional features, Datapac service has two main rating elements -- an access charge that varies with each Datapac service offering, and a network-usage charge that applies to the total number of packets transmitted to and received from the network (based on the grade of the Datapac service areas and the associated rate distances).

Both Infoswitch and Datapac can be connected to numerous other countries through Teleglobe Canada's Globedat international data gateway which routes packet- and circuit-switched traffic and provides low-to-medium speed data transmission. Other access arrangements may be provided by Teleglobe as required. Charges consist of two basic components applied at the call-orginating end: national network access charges; and international network usage charges based on volume (measured in kilocharacters or kilosegments), and call duration (measured in minutes).

There are few restrictions on the use of public data networks as long as technical criteria are met. Thus, terminal attachment policies for public data networks have been considerably more liberal than those for voice. The primary concern has been to prevent damage to the networks. Private-line data circuits are generally available from the telephone companies, CNCP and B.C. Rail. Such circuits may be analogue in nature and could be provided on facilities similar to those used for private-line voice. Alternatively, circuits may be digital and provided on the non-switched digital networks of Telecom Canada (Dataroute) and CNCP (Infodat).

ii) Switched teleprinter and other text

CNCP and Telecom Canada compete in the provision of switched teleprinter services. Telex service is provided by CNCP and Québec-Téléphone. A comparable service, teletypewriter exchange (TWX) service, is provided by Telecom Canada. The two services combined allow access to over one million telex or telex-type installations around the world. CNCP and others provide facsimile communication services which allow for the transmission of text or graphics over their networks, with Teleglobe providing connection to overseas destinations on its Globefax facsimile service.

A number of new electronic message, mail and text services have been introduced over the past several years. Among the services that have been introduced are Telepost, Intelpost, Envoy 100, Envoy Post, Teletex and Infotex. Telepost is a combined CNCP/Canada Post Corporation messaging service. Intelpost is an experimental Teleglobe/Canada Post facsimile/electronic mail service interconnected to the CNCP/Canada Post domestic facsimile network. Envoy 100 is a national store-and-forward messaging service offered by Telecom Canada and Québec-Téléphone. Envoy Post is an Envoy 100 option offered co-operatively by Telecom Canada and Canada Post. Teletex and Infotex are Telecom Canada and CNCP services, respectively, which allow word processing equipment of different manufacturers to communicate with each other. International extension of both services is provided by Teleglobe under the name Globetex.

iii) Public message service

Public message service, commonly known as telegram service, is offered by CNCP throughout Canada and, in conjunction with Teleglobe, to virtually anywhere in the world. CNCP has a monopoly in the provision of this service. In the face of newer technologies, however, customer demand for telegram service has declined dramatically over the past few years.

iv) Program transmission

CNCP and Telecom Canada, together with certain other telephone companies, compete in the provision of audio and video program transmission services to Canadian businesses, primarily those in the broadcasting industry. Carrier facilities, either terrestrial or satellite, are used on a local, regional or national basis for the transmission of radio, television and cable television signals. Video conferencing facilities are publicly available at selected locations across the country.

1.4.5 Financial Aspects of the Canadian Industry

An overview of the financial aspects of the Canadian telecommunications industry is presented in Tables 1.4 to 1.7. With 1984 total operating revenues

in excess of $10 billion (Table 1.4), the industry is considered an important sector of the Canadian economy, matching revenues generated by the primary industries. Bell Canada, operating in the two most populous provinces, Quebec and Ontario, generated 51.7 per cent of total industry operating revenues, by far greater than any other telephone company. Tables 1.5, 1.6 and 1.7 provide 1984 financial data for the telephone industry on a province-by-province basis. The information for Quebec and Ontario has been combined because data relating to Bell Canada were available only on a company-wide basis. These data also contain the aspect of Bell Canada's provision of telephone service in the eastern portions of the Northwest Territories.

In a similar way, the data of NorthwesTel are included with those for British Columbia. This does not significantly distort provincial data because of the relatively small size of the territorial operations. Unfortunately, separate information is not available to provide a financial picture of the provision of telephone services in the territories. The closest approximation would be to examine separately the financial data of NorthwesTel.

TABLE 1.4
Total Telecommunications Industry Operating Revenues (1984*)

Company	1984 Operating Revenues ($ millions)	% of Total
Newfoundland Telephone	127.0	1.2
Terra Nova Telecommunications	38.2	0.4
Island Telephone	30.5	0.3
Maritime Telegraph and Telephone	282.1	2.8
New Brunswick Telephone	229.6	2.4
Bell Canada	5 290.6	51.7
Québec-Téléphone	164.1	1.6
Télébec	100.0	1.0
Northern Telephone	25.9	0.3
Thunder Bay Telecommunications	20.3	0.2
Manitoba Telephone System	294.3*	2.9
Saskatchewan Telecommunications	382.7	3.7
Alberta Government Telephones	978.8	9.6
'edmonton telephones'	181.8	1.8
British Columbia Telephone	1 147.8	11.2
NorthwesTel	55.6	0.5
Telesat Canada	128.0	1.3
Teleglobe Canada	201.6	2.0
CNCP Telecommunications	338.1	3.3
Radio Common Carriers	157.0	1.5
Other Telecommunication Companies	57.0	0.6
TOTAL	**10 231.0**	**100.0**

* For Manitoba Telephone System, fiscal year ending 31 March 1984.

Source: DOC, "Telecommunications in Canada Quick Facts - 1984."

TABLE 1.5
Operating Revenues and Expenses of the Telephone Industry by Province (1984)
($ Millions)

Operating revenues and expenses	Nfld.	PEI	N.S.	N.B.	Ont/Que*	Man.	Sask.	Alta.	B.C.**	Total
Operating revenues:										
Local service revenue	56.1	13.5	107.9	83.5	2 330.5	115.2	112.7	435.7	455.1	3 710.2
Toll service revenue	93.2	16.0	155.9	129.3	2 816.2	184.5	249.7	620.0	678.3	4 943.0
Miscellaneous operating revenue	16.2	1.3	13.1	17.7	396.9	22.5	22.8	116.7	87.5	694.8
Less uncollectible operating revenue	0.2	0.1	1.2	0.7	24.0	1.6	2.3	11.8	14.1	55.9
Total operating revenue	165.2	30.5	275.8	229.9	5 519.6	320.5	382.9	1 160.7	1 206.8	9 292.0
Total operating expenses:	103.5	19.3	175.1	146.1	3 606.1	247.0	274.1	832.4	834.9	6 238.4

* Includes data of Bell Canada, which operates in Quebec, Ontario and the Northwest Territories.
** Includes data of NorthwesTel Inc.

Source: DOC, "Telecommunications in Canada Quick Facts - 1984."

TABLE 1.6
Income Statement of the Telephone Industry by Province (1984)
($ Millions)

Item	Nfld.	PEI	N.S.	N.B.	Que./Ont.*	Man.	Sask.	Alta.	B.C.**	Total
Total operating revenue:	165.2	30.5	275.8	229.9	5 519.6	320.5	382.9	1 160.7	1 206.8	9 292.0
Less total operating expenses	103.5	19.3	175.1	146.1	3 606.1	247.0	274.1	832.4	834.9	6 238.4
Net operating revenue	61.7	11.2	100.7	83.8	1 913.5	73.5	108.8	328.3	372.0	3 053.6
Other Income:										
Interest earned	0.8	0.3	2.2	0.7	23.6	10.0	4.8	59.2	0.2	101.9
Dividends earned	—	—	0.9	—	58.9	—	—	—	0.3	60.1
Other	1.4	—	(1.5)	1.9	35.9	4.7	—	4.6	194.7	241.8
Sub-total	2.3	0.3	1.6	2.7	118.4	14.7	4.8	63.9	195.2	403.9
Other expenses:										
Interest charges	17.3	3.0	27.1	18.6	430.5	59.9	71.4	322.2	125.9	1 075.9
Taxes other than income taxes	0.8	0.6	7.6	8.5	372.9	7.9	6.5	36.0	60.7	501.6
Other	—	—	0.4	—	23.3	5.5	-	20.0	181.7	231.0
Sub-total	18.1	3.7	35.1	27.1	826.8	73.3	77.9	378.3	368.3	1 808.5
Net profit (loss) before income taxes	46.0	7.8	67.2	59.4	1 205.2	15.0	35.6	13.9	198.9	1 648.9
Income taxes:										
Deferred	2.4	0.4	5.8	4.4	(5.0)	—	—	—	75.1	83.2
Current	21.1	3.2	27.4	26.1	526.8	—	—	—	13.5	618.1
Sub-total	23.5	3.6	33.2	30.5	521.8	—	—	—	88.6	701.3
Net profit for year ended 31 December 1984	22.5	4.2	33.9	28.9	683.4	15.0	35.6	13.9	110.3	947.6

* Includes data of Bell Canada, which operates in Quebec, Ontario and the Northwest Territories.
** Includes data of NorthwesTel Inc.

Source: DOC, "Telecommunications in Canada Quick Facts - 1984."

TABLE 1.7
Assets, Liabilities and Net Worth Data of the Telephone Industry, by Province (1984)
($ Millions)

Item	Nfld.	PEI	N.S.	N.B.	Que./ Ont.*	Man.	Sask.	Alta.	B.C.**	Total
Total telephone plant (at cost)	531.7	96.2	835.6	642.4	15 298.4	1 083.2	1 176.7	3 748.3	3 894.9	27 307.2
Less accumulated depreciation	178.7	29.4	276.6	229.9	4 984.4	482.4	411.1	1 325.1	1 183.5	9 101.3
Sub-total net telephone plant	353.0	66.8	558.9	412.4	10 313.9	600.8	765.6	2 423.2	2 711.4	18 205.9
Investments	0.3	0.1	11.4	8.3	492.7	77.0	20.0	22.6	24.5	657.0
Deferred charges	4.3	0.7	6.6	5.9	318.7	28.4	47.8	51.5	21.6	485.6
Other assets	0.4	—	—	—	74.2	—	9.8	29.2	16.6	130.2
Current assets	30.1	5.6	55.0	44.6	984.9	76.8	62.6	237.8	299.5	1 796.9
Total assets	**388.1**	**73.2**	**632.1**	**471.3**	**12 184.4**	**783.0**	**905.8**	**2 764.2**	**3 073.6**	**21 275.5**
Current liabilities	22.4	8.2	48.0	28.5	1 402.1	89.9	65.7	389.0	333.2	2 387.1
Long-term debt	152.3	23.1	240.4	164.5	4 059.8	570.7	—	2 248.6	1 152.2	8 611.6
Deferred credits	26.6	10.4	97.8	79.1	1 632.5	0.3	0.7	20.3	425.2	2 292.9
Stated value of issued capital stock:										
Common	114.1	6.6	69.1	81.8	2 089.8	—	2.9	—	653.8	3 018.1
Preferred	27.5	6.3	36.0	13.6	415.1	—	—	—	262.9	761.5
Premium on capital stock	0.8	7.6	38.3	19.8	1 033.5	—	—	—	—	1 099.9
Proprietary equity of provincial & other governments	6.5	-	-	-	33.5	—	663.5	—	—	703.4
Retained earnings	37.9	11.1	1 02.4	84.0	1 518.0	122.1	173.0	106.2	246.3	2 400.9
Sub-total net worth	186.8	31.5	2 45.8	199.1	5 090.0	122.1	839.4	106.2	1 163.0	7 983.8
Total liabilities & net worth at 31 December 1984:	**388.1**	**73.2**	**6 32.1**	**471.3**	**12 184.5**	**783.0**	**905.8**	**2 764.2**	**3 073.6**	**21 275.5**

* Includes data of Bell Canada, which operates in Quebec, Ontario and the Northwest Territories. Bell Canada's 1984 Annual Report shows total assets $11 375.40 or 93.4 per cent of total Quebec and Ontario.
** Includes data of NorthwesTel Inc.

Source: DOC, "Telecommunications in Canada Quick Facts - 1984."

1.5 Canadian Regulatory Environment

1.5.1 General Structure

The Canadian telecommunciations regulatory environment has evolved into a structure in which telecommunications common carriers are regulated by: (a) the federal regulatory agency (the CRTC), (b) a provincial government public utilities board or commission or, in some cases, (c) a municipal council. Teleglobe Canada is an exception in that it is not regulated by an independent agency.

1.5.2 Canadian Telecommunications Regulation in Detail

Table 1.8 provides a list of the major telecommunication companies and their respective regulatory agencies. The CRTC regulates Bell Canada, the British Columbia Telephone Company, Terra Nova Telecommunications, NorthwesTel, CNCP Telecommunications and Telesat Canada. These companies represent the major portion of telecommunication activities within Canada. Each of the provincial governments also maintains a regulatory agency for the purpose of regulating telecommunication companies under its jurisdiction. In the case of Newfoundland, Nova Scotia, Prince Edward Island, New Brunswick, Manitoba, Saskatchewan and Alberta, the province regulates the principal telephone company operating within its borders. In the case of Quebec, Ontario and British Columbia, the independent companies are also regulated at the provincial level. In two cases, 'edmonton telephones' and Prince Rupert City Telephones, regulation is exercised by the respective municipal council.* As noted previously, Teleglobe Canada is not regulated by an agency. Instead, it reports to the federal Minister responsible for the Canadian Development Investment Corporation.

Table 1.9 provides details of the telecommunications regulatory practices of each of the provinces and the federal government. This table is provided as background to possible regulatory issues that may arise during the course of the examination and to ensure a shared understanding of key elements of the Canadian regulatory environment. One comment that can be made is that, while differences in detail exist, commonality in overall approach is evident.

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* The British Columbia Utilities Commission regulates the part of Prince Rupert City Telephones outside the municipal boundaries of Prince Rupert.

TABLE 1.8
Major Canadian Telecommunications Carriers and Their Regulatory Agencies

Company	Regulatory Agency
Newfoundland Telephone	Newfoundland Board of Commissioners of Public Utilities
Terra Nova Telecommunications	CRTC
Island Telephone	Public Utilities Commission of Prince Edward Island
Maritime Telegraph and Telephone	Nova Scotia Board of Commissioners of Public Utilities
New Brunswick Telephone	New Brunswick Board of Commissioners of Public Utilities
Bell Canada	CRTC
Québec-Téléphone	Régie des services publics du Québec
Télébec	Régie des services publics du Québec
Northern Telephone	Ontario Telephone Service Commission
Thunder Bay Telecommunications	Ontario Telephone Service Commission
Manitoba Telephone System	Manitoba Public Utilities Board
Saskatchewan Telecommunications	Saskatchewan Public Utilities Review Commission
Alberta Government Telephones	Alberta Public Utilities Board
'edmonton telephones'	City of Edmonton
British Columbia Telephone	CRTC
Prince Rupert	City of Prince Rupert and British Columbia Utilities Commission
B.C. Rail	Not regulated by an agency
NorthwesTel	CRTC
Telesat Canada	CRTC
CNCP Telecommunications	CRTC
Teleglobe Canada	Not regulated by an agency

TABLE 1.9
Overview of Canadian Telecommunications Regulatory Practices

	NEWFOUNDLAND	P.E.I.	NEW BRUNSWICK	NOVA SCOTIA
Name of Regulating Authority:	Board of Commissioners of Public Utilities	Public Utilities Commission	Board of Commissioners of Public Utilities	Board of Commissioners of Public Utilities
The Board				
- Full Time	3 or more		1 (indeterminate)	7
- Part Time		3	6 (at pleasure)	
- Tenure	indeterminate	not specified	above	good behaviour - to age 70 years
Regulates (exempt services below)	telephone, telegraph, electric power	telephone, electric energy, persons declared to be a public utility, water, sewage, motor carriers	telecommunications, gas, auto insurance rates, motor carriers, (excludes NB Elect. Pwr. Commission)	telecommunications, electric power, motor carriers, water utilities, salvage yards, gasoline & fuel oil, Halifax-Dartmouth bridges
Cabinet direction	Yes (telecommunications)	No	Yes	No
Power to make regulations	Yes	Yes	Yes	Yes
Regulations issued	Yes	Yes	No	Yes
Must approve				
- Debt	Yes	Yes	Yes	Yes
- Equity	Yes	Yes	Yes	Yes

Source: Telcom Canada, 1983. Updated by members of the examination.

TABLE 1.9 (Continued)

	QUEBEC	ONTARIO	MANITOBA
Name of Regulating Authority:	La Régie des services publics	Ontario Telephone Service Commission	Manitoba Public Utilities Board
The Board	9 (4 additional, if required)	1	0
- Full Time			4
- Part Time			
- Tenure	10 years (maximum)	Not specified	Indeterminate
Regulates (exempt services below)	Telephone, educational proramming of Radio Québec, joint use of certain public utilities, approval of plans for underground conduits for public utilities in the City of Montreal	telephone	telephone, natural gas, water and sewer utilities
Cabinet direction	No	Yes	No
Power to make regulations	Yes	No	Yes
Regulations issued	Yes	One only	No
Must approve			
- Debt	No (but the Board takes into account in practice)	Yes, not specified	N/A
- Equity	No (but the Board takes into account in practice)	Yes	N/A

TABLE 1.9 (Continued)

	SASKATCHEWAN	ALBERTA	BRITISH COLUMBIA	FEDERAL
Name of Regulating Authority:	Public Utilities Review Commission	Public Utilities Board	B.C. Utilities Commission	Canadian Radio-television and Telecommunications Commission
The Board				
- Full Time	1	7	7 (5 years tenure)	9 (7 years tenure)
- Part Time	6	3	Temporary (as req'd)	10 (5 years tenure)
- Tenure	5 years	unspecified	above	above
Regulates (exempt services below)	rates for non-competitive telecommunication services, natural gas, electrical rates, basic automobile insurance rates	telecommunications, railways, water heat, light, power, common carrier oil pipelines	energy, utilities (electric, natural gas, piped propane), telecommunications	telecommunications (federal carriers), broadcasting
Cabinet direction	Yes	No	Yes	No
Power to make regulations	No, however, regulations can be made by Lieutenant Governor in Council	Yes	Yes	Yes
Regulations issued	N/A	Yes	No	Yes (for broadcasting)
Must approve				
- Debt	Yes | Ratios - Yes	No	Yes	No
- Equity	Yes | New Issues - No	No	Yes	Yes - Bell Canada, B.C. Tel

TABLE 1.9 (Continued)

	NEWFOUNDLAND	P.E.I.	NEW BRUNSWICK	NOVA SCOTIA
Regulation base	Net asset	Net asset	Net asset	Net asset
Construction approval required	Over $50 000 (lease over $5 000)	Yes	No Program reviewed with Board at rate review	Yes
Depreciation - Rates	Fixed	Fixed	Fixed	Fixed
- Method	Straight line	Straight line	Straight line	Straight line
Contract - Approval	Not specified	Not specified	Not required	Not specified
- Practice	No	No	No	
Fair rate of return	Yes	Yes	Yes	Yes
Public hearings - required	Yes	Yes	Yes	Yes
- Participation	Yes	Yes	Minister of Justice represents public interest	Yes
Legal evidence required	Not specified	Not specified	Yes	No
Witnesses sworn	Yes	Yes	Yes	Yes
Expenses of Board	Assessed to Public Utilities	Assessed to Public Utilities	Assessed to Public Utilities	Assessed to Public Utilities
Taxation of Costs - Power	Yes	Not specified	No	Yes
- In practice	Yes	No	No	No

TABLE 1.9 (Continued)

	QUEBEC	ONTARIO	MANITOBA
Regulation base	Not specified in legislation, but Board uses the tariff base (assets available to the public) and common shareholders' equity		Not specified
Construction approval required	Five-year development plan examined annually	Not specified (program filed)	No
Depreciation - Rates	Approved	Approved	Fixed after hearing
- Method	Straight line, estimated useful life or residual life	Not specified	Not specified
Contract - Approval	In cases of exchange of services between telephone utilities, merger or acquisitions of telephone utilities	Not specified	No
- Practice	Yes	Yes - other telephone companies	-
Fair rate of return	Yes (fair and reasonable rates)	Yes	No
Public hearings - required	Yes (in general)	Not required by act	Yes
- Participation	Yes	SPP Act used	Yes
Legal evidence required	Yes (in accordance with the Rules of Procedure before the Board)	as above	Yes
Witnesses sworn	Yes	as above	Yes
Expenses of Board	From Consolidated Revenue Fund (Note that the gvt levies fees and taxes from telephone utilities)	Appropriated by Legislature	Consolidated funds of Province
Taxation of Costs - Power	Yes	[illegible]	Yes
- In practice	In certain cases	No	No

TABLE 1.9 (Continued)

	SASKATCHEWAN	ALBERTA	BRITISH COLUMBIA	FEDERAL
Regulation base	Not determined	Net asset	Rate base	Total Capital
Construction approval required	No	Not specified	No	Construction program review
Depreciation - Rates	Approved	Fixed	Specified	Approved
- Method	Straight line method, equal life group procedures, remaining life technique	Not specified	Straight line	Equal life group
Contract - Approval	Yes, if they relate to rates	Not specified	Yes	Yes (agreements)
- Practice	Same as above	-	Yes	-
Fair rate of return	Not specified	Yes	Yes	Not specified
Public hearings - required	Discretionary, are normally held	Yes	Yes	Yes
- Participation	Yes	Yes	Yes	Yes
Legal evidence required	No	No	-	No
Witnesses sworn	Yes	Yes	Yes	Yes
Expenses of Board	Administrative costs - Treasury Board Hearing costs - Crown Corporation	Yes	Financial Administration Act	General Funds
Taxation of Costs - Power	Yes	Yes	Commission costs recoverable	Yes
- In practice	Yes	No	Yes	Yes

TABLE 1.9 (Continued)

	NEWFOUNDLAND	P.E.I.	NEW BRUNSWICK	NOVA SCOTIA
Inquire into mgm't	Yes - general investigation powers	General powers of investigation	Yes, may investigate any matter, including commercial marketing practices	General supervision of all public utilities
Permit concession service	Yes	Yes	Yes	
Confidentiality clause	No - in practice, confidential information filed	No, however, confidential information filed	Yes	No, but confidential information filed
Fix or approve rates	Both	Both	Both	Both
Order interconnection	No	Yes	Yes	Yes
Permit attachment				
- Charter	No	No mention	No	
- Board	Voluntary Program residential extensions	No mention	Yes	
Regulate non-carrier activities	No	No	No	Yes
Reasons for decisions	No	No	Not required, but given	No
Staffing - specific jobs	Legal counsel, engineers, accountants as required	May appoint experts to carry out Act	Attorney General appoints Public Intervenor, Board can retain outside consultants	
Sale of equipment	Yes	Yes - only non-regulated	Yes	Yes - set guidelines
- price regulation	No	No	No	Set guidelines

TABLE 1.9 (Continued)

	QUEBEC	ONTARIO	MANITOBA
Inquire into mgm't	Yes - general investigatory authority	Regulation on power concerning business practices	Power to conduct all inquiries to ensure compliance with law
Permit concession service	-	Yes - comm. app.	No
Confidentiality clause	No (in practice, information furnished confidentially)		No - anything filed is public
Fix or approve rates	Both	Approve	Both
Order interconnection	Of networks, prohibited; of terminals, allowed	Yes, must have commission approval	No
Permit attachment			
- Charter	No	No	Yes - Cabinet (other telecommunication carriers)
- Board	Yes	Applications made to Commission	Yes - Man. Tel Board (terminal equipment)
Regulate non-carrier activities	No	No	No
Reasons for decisions	Not expressly required by legislation, but given in practice	No	Yes
Staffing - specific jobs	Secretary, engineers, analysts	Secretary and others as necessary	Yes - experts occassionally to carry out business of Board
Sale of equipment	Yes	Yes	No
- price regulation	Prices are filed with the Board	Y. .	No

TABLE 1.9 (Continued)

	SASKATCHEWAN	ALBERTA	BRITISH COLUMBIA	FEDERAL
Inquire into mgm't	Yes as it affects rates	General powers to deal with public utilities	General supervision of utilities	
Permit concession service	Yes	Yes	-	Yes - Railway Act, s.291
Confidentiality clause	Yes	No	Yes	Yes
Fix or approve rates	Both	Both	Both	Both
Order interconnection	No	Yes	-	Yes
Permit attachment				
- Charter	No	No	-	Yes
- Board	No	No - must be approved by AGT	-	Yes
Regulate non-carrier activities	No	No	-	-
Reasons for decisions	Yes	Yes	Decision issued following hearing	Not required by statute
Staffing - specific jobs	Experts as required	Secretary and engineers, accountants, lawyers as necessary	Secretary, other officers and other employees	
Sale of equipment	No	Yes, if outside ordinary course of business	Yes	Yes
- price regulation	No	No	No	Yes - floor price regulation

TABLE 1.9 (Continued)

	NEWFOUNDLAND	P.E.I.	NEW BRUNSWICK	NOVA SCOTIA
Competitive tariffs	No	No	No	Set guidelines
Power to expropriate (Co. power)	No	With Commission approval, land may be expropriated by Public Utilities. Public Utilities may not expropriate each other's land	Lft-Gov-in-Council may take over property, etc. any time and Legislature will approve expropriation	No
Appeals	Yes	Yes	Yes	Yes
- Type of Court	Court of Appeal	Supreme Court in banco	Supreme Court of N.B. (Appeal Division)	Appeal Division of Supreme Court
- Basis	Jurisdiction or law	Jurisdiction or law	Any question of fact or law	Jurisdiction or law
- Petition to Governor Lft-Gov-in-Council	No	No	No, Court of Appeal final	No

TABLE 1.9 (Continued)

	QUEBEC	ONTARIO	MANITOBA
Competitive tariffs	Yes (tariffs are filed with the Board)	Yes	No
Power to expropriate (Co. power)	No, except a utility	Municipal telecom systems may expropriate any system	No - although Man Tel has guaranteed right of way
Appeals	Yes	Yes	Yes
- Type of Court	Quebec Court of Appeal	Divisional Court	Court of Appeal
- Basis	Jurisdictional or automatic	Question of law or jurisdiction	Law, jurisdiction or any fact
- Petition to Governor/Lft-Governor in Council	No	Yes	No mention

TABLE 1.9 (Continued)

	SASKATCHEWAN	ALBERTA	BRITISH COLUMBIA	FEDERAL
Competitive tariffs	No	No	-	Yes - Railway Act, s.274
Power to expropriate (Co. power)	SaskTel can expropriate land	AGT may expropriate land	-	No
Appeals	Yes	Yes	Yes	Yes
- Type of Court	Court of Appeal	Court of Appeal	Court of Appeal	Federal Court of Appeal
- Basis	On questions of law or jurisdiction	Jurisdiction or law	-	Question of law or jurisdiction
- Petition to Governor/Lft-Governor in Council	No	-	-	Yes

TABLE 1.9 (Continued)

	NEWFOUNDLAND	P.E.I.	NEW BRUNSWICK	NOVA SCOTIA
Powers subject to approval of minister				Gasoline and fuel oil; some motor carriers
Existing Regulations - Source	Filed with tariff	Filed with tariff	Filed with tariff	Filed with tariff
- Force of law	Company can enforce these, have Board approval	Yes		Yes
Offenses & Penalties				No - charges through the courts under Summary Convictions Act
Fix standards - power	Yes	Not specified	Yes	Yes
- practice	Newfoundland Tel sends quarterly reports on quality of service. No standards issued		Quality of service indicators reviewed each general rate hearing	Yes - in conjunction with rate hearings
Accounting methods prescribed	Yes	Yes	Yes	Yes
Applicable Legislation	• The Public Utilities Act	• Public Utilities Commission Act • Electronic Power and Telephone Act	• Public Utilities Act • Telephone Companies Act • Act of Incorporation, NB Telephone Company, Limited	• Public Utilities Act • Gasoline & Fuel Oil Licensing Act • Motor Carrier Act • Salvage Yard Act
Exempt from Regulation	• Mobile services • Data services • PBX modifications • Yellow pages • Special customer modifications • Paging • All special assembly tariff items		• Telecom Canada computer communications and other non-tariffed services	• Telecom Canada competitive services • Private mobile telephone not regulated while telephone exchange service is regulated

TABLE 1.9 (Continued)

	QUEBEC	ONTARIO	MANITOBA
Powers subject to approval of minister	No		
Existing Regulations			
- Source	Regulation respecting telephone utilities; Rules of Procedure		Filed with tariff
- Force of law	Yes, when passed	Not approved by Commission	Board approval
Offenses & Penalties	Yes, stipulated by legislation. Legal action is taken under Summary Convictions Act		Set by legislation
Fix standards - power	Yes	Not specified	Yes
- practice	Yes	Yes	No
Accounting methods prescribed	No (with exceptions)	Yes	No
Applicable Legislation	• An Act Respecting the Régie des services publics • An Act Respecting Certain Public Utility Installations • Charter of the City of of Montreal (a number of articles)	• Telephone Act • Municipal Act • Public Utilities Act • Public Utilities Corporation Act	• Public Utilities Board Act • Manitoba Telephone Act
Exempt from Regulation	• Radio search for missing persons • Yellow pages	• Ontario Northland Transportation Commission	• Competitive services

TABLE 1.9 (Continued)

	SASKATCHEWAN	ALBERTA	BRITISH COLUMBIA	FEDERAL
Powers subject to approval of minister	Yes		No	-
Existing Regulations - Source	Regulation under SaskTel Act No regulations under PURC Act		- -	No telecommunication regulations
- Force of law	No regulations under PURC Act			
Offenses & Penalties	Subject to approval of Attorney General	Yes	Yes	Yes
Fix standards - power	No	Yes	Yes	
- practice	Yes, as it has a direct effect on rates	Yes	Yes	
Accounting methods prescribed	Yes	Yes	Yes	No - power, yes
Applicable Legislation	• Saskatchewan Telecommunications Act • Saskatchewan Power Corporation Act • Automobile Accident Insurance Act • Saskatchewan Government Insurance Act • Public Utilities Review Commission Act	• Public Utilities Board Act • Dept. of Utilities and Telephones Act Water, Gas, Electric and Telephones Act • Rural Mutual Telephone Companies Act • AGT-Edmonton Telephone Act • Administrative Procedures Act	• Utilities Commission Act	• Railway Act • National Transportation Act • Telegraphs Act • Act to Incorporate Bell Telephone Co. of Canada • CRTC Act • B.C. Tel Special Act • CNCP Act • CP Ltd. Special Act • Telesat Canada Act
Exempt from Regulation	Competitive services	Non-basic services	Non-utility services	

It is also worth noting that, for most regulatory agencies, telecommunications regulation is only one of several areas of responsibility. This is particularly the case for most provincial agencies. In areas such as rate setting, depreciation practices, regulation making, the rate base, public hearings and the like, similar approaches have been adopted by the provincial regulators. In other areas -- for example, exemptions from regulation -- important differences exist. Some agencies regulate all services provided by telephone companies under their jurisdiction, while others exempt them from certain classes, such as competitive services.

The public hearing process is also an integral part of regulatory practice in Canada. Regulators hold public hearings on important matters that come before them, encourage public input and receive submissions from interested parties.

Originally, the primary purpose of telecommunications regulation was to protect subscribers against overcharging by monopoly providers of telecommunication services. The role of regulatory agencies has, however, evolved to include a broad oversight of a variety of telecommunication company activities, "in the public interest." Thus, whereas telecommunication companies are generally regulated by the approval or disapproval of applications brought by them, Table 1.9 indicates that regulatory agencies also hold broad powers to make regulations, approve construction, inquire into management, order interconnection and fix standards.

CHAPTER 1

ENDNOTES

1. Woodrow, R. Brian and Kenneth B. Woodside, "Players, Stakes and Politics in the Future of Telecommunications Regulation in Canada." Paper presented to the Conference on Competition and Technological Change: The Impact on Telecommunications Policy and Regulation, Toronto, 25-26 September 1984: pp.7-8 (Manuscript).

2. Canadian Radio-television and Telecommunications Commission, "Interexchange Competition and Related Issues," Telecom Decision CRTC 85-19, 29 August 1985.

3. Ibid: p.53.

4. Ibid: p.67.

5. Ibid: pp.68-69.

CHAPTER 2

Local and Long-Distance Rating Principles and Practices

CHAPTER 2

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2.1 Introduction

2.1.1 Description of Local Services

Canadian telephone companies provide a wide variety of local services, generally referred to as "exchange services" in company tariffs. They range from services that satisfy the basic day-to-day voice telecommunication needs of subscribers to the leasing of high-speed dedicated data communication channels.

For the purposes of this examination, basic local service is defined as the provision of telephone service to each individual subscriber at his or her primary residence and/or business in order to meet day-to-day two-way voice communication needs. Across Canada, the basic local service package is very similar. It normally consists of the following service elements:

(1) one connection device, often a jack
(2) inside wiring to the jack
(3) a protection device
(4) drop wire
(5) a connecting device to the outside plant facilities
(6) outside plant facilities to the central office
(7) unlimited local network usage
(8) access to long-distance services
(9) access to services of the company's operators
(10) maintenance and repair service
(11) directory listing and one or more directories
(12) directory assistance listing and, in some cases, directory assistance calling.

Service elements (1) through (6) allow a customer to access the telephone network: they are collectively known as the "local loop". There are three major variations in this basic local service package:

1. Customer provision of the primary telephone set.

In Bell Canada, B.C. Tel, NorthwesTel, Terra Nova Tel, AGT, Québec-Tél, Télébec, NBTel and Island Tel territories, the basic local service

rate does not include rental of the telephone set. Subscribers have the choice of renting their telephone sets and other terminal equipment from the telephone companies or purchasing their own and attaching them to the telephone network. In MT&T territory, subscribers can own their own primary set, but an MT&T provided set is nonetheless included in the basic local service rate. In Manitoba Telephone System, SaskTel and Newfoundland Tel serving areas, the rental of a rotary-dial telephone set is included in the basic service package. The attachment of certain customer-provided terminals such as residence extension sets or non-network addressing devices is permitted in all of these territories.

2. Number of stations per loop.

Canadian telephone companies provide two main grades of exchange service, namely, individual-line service (ILS) and party-line services. ILS provides for the connection of one main telephone to a central office line. Party-line services provide for the connection of two (two-party line service) or more (multi-party line service) main telephones to the same central office line.

Across Canada the standard grade of service is ILS or two-party service inside base rate areas* and two-party or four-party (in rare instances more than four) service outside base rate areas. SaskTel, however, no longer provides two-party service. Rating practices connected with various grades of service are described in greater detail in section 2.3.8.

3. Directory assistance calling.

The types and amount of originating local directory-assistance calling included in the basic local service package differ among Canadian telephone companies. Long-distance directory assistance is almost always included. The exception is calls to the United States, for which customers are charged (after a free monthly allowance of calls ranging from 50 in Manitoba Telephone System territory to 250 in Bell Canada territory). Customers are also charged, except

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* Base rate areas are the more densely populated and well developed areas of an exchange.

in the case of SaskTel, for each call when the number requested appears in the telephone directory. However, exemptions are granted to certain classes of subscribers such as the handicapped.

2.1.2 Description of Long-Distance Services

Long-distance voice services (also referred to as interexchange or toll services) may be broken down into three principal categories: message toll service (MTS), wide area telephone service (WATS) and private-line service.* MTS is the basic long-distance service providing communications between subscribers in different telephone company exchanges. Charges for the service are based on distance and call duration. Additional charges are assessed for operator assistance and special billing arrangements such as reverse charging and third-party billing. The service is used extensively by both business and residence customers and it is the largest single revenue source for the telephone industry.

WATS is a form of bulk discounted MTS provided by most Canadian telephone companies (except for Terra Nova and NorthwesTel), mainly to business customers. The service is provided on a zoned basis and customers lease dedicated access channels for service to specific zones, typically based on number plan areas (NPAs)** -- zone 1 typically being the NPA of the customer, zone 2 being adjacent NPAs and so on to zone 6 which covers all of the NPAs in the country. Charges for WATS comprise a flat rate for a base volume of calling and usage- sensitive charges for calling above the base volume.

Private-line service is also primarily a business service and provides for non-switched dedicated communication channels between telephone company exchanges. This service may be provided using either terrestrial or satellite facilities. For most applications, private lines may be configured in three ways: (a) tie trunks which are connected to a customer's PBX or Centrex in each exchange; (b) foreign exchange (FX) service which connects a customer's telephone, PBX or Centrex in one exchange to a telephone company central office

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* In addition there are a number of interexchange data services including telex, datapac, dataroute, infoswitch and various specialized enhanced services. These services are not treated further in this paper.

** North America has been divided into NPAs or area codes, each with an individual three-digit number. These numbers must be dialed to reach telephones outside of the originator's NPA.

in another exchange; and (c) off-premises extensions (OPXs) which connect a customer telephone in one exchange to a PBX in the same or another exchange. Rates for private-line service are based on distance. Private lines are available as individual circuits which are often termed inter-city voice grade channels or IXVGs. Some telephone companies also offer private lines in packages of 12, 24, 60 and 120 circuits. These packages, called Telpak channels, provide large discounts relative to individual circuits.

MTS and WATS services are offered on a monopoly basis by the telephone companies. Interconnected private lines* are offered competitively by CNCP in the operating areas of Bell Canada, and by CNCP and B.C. Rail in British Columbia. CNCP also offers non-interconnected private-line services across Canada as does B.C. Rail in British Columbia. Finally, Telesat Canada is a potential competitor in the private-line market.

2.2 Rating Objectives

As part of this examination, Canadian telephone companies were asked to provide descriptions of their rating objectives.[1] Bell Canada described its objectives in terms of customer satisfaction; the need to have adequate and stable revenues; maximization of penetration and use of the network; equitable distribution of charges among different classes of services; rates that are simple and easy to understand and administer; rates structures that are consistent with economic concepts and provide proper pricing signals; and finally, meeting the competition. Manitoba Telephone System listed promoting universality of access and basic local service; achieving financial objectives and revenue stability; distributing charges fairly and reasonably; and promoting effective use of the network, services and resources as its objectives.

Other companies described their rating objectives in general terms. Among these, B.C. Tel and AGT see their main objective as providing universal service at affordable rates. NBTel identified universal service and sufficient revenues as objectives. Newfoundland Tel described recovering total costs and earning adequate and stable revenues as objectives.

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* Private-line service may be provided on an interconnected or non-interconnected basis. Interconnected private lines provide for calling connected to the public switched telephone network. Interconnected lines are not considered to be private lines by some telephone companies.

Despite this diversity, a recurring theme emerges: It appears that the over-riding objectives of Canadian telephone companies are to maximize penetration and use of the public-switched network, and to have adequate and stable revenues.

2.3 Rating Principles and Practices

While Canadian telephone companies describe their rating objectives in a variety of ways, they are unanimous in stating the same two most important rating principles to which they subscribe, namely: (a) value of service, and (b) company-wide price averaging. In addition, there are a number of other rating practices and principles discussed in this section.

2.3.1 Value of service

The value-of-service concept recognizes that telephone services are more valuable to some classes of subscribers than to others. The principle of value-of-service rating is extensively applied in practice in the case of local services, where it is the basis for rate group structures and for the difference between residence and business rates.

a) Local service

Rate differentials between residence and business services

All Canadian telephone companies price their residence services significantly lower than business services on the basis that the value of service to a business subscriber is greater than it is to a residential subscriber. A review of local telephone rates for selected cities across Canada indicates that, for these cities, residence ILS rates fall within a narrow range of 30 to 40 per cent of business service rates, as shown in Table 2.1.

This has been the practice, even though the costs of providing access to the telephone network (loop costs) are not significantly different whether service is provided to residential or business subscribers. In fact, the same loop may provide service to a residential customer at one time and to a business customer at others.

TABLE 2.1
Monthly Exchange Local Telephone Rates,
Individual Line (January 1986)

City	Residence	Business	Residence as % of Business
Victoria	$11.70	$31.85	37.0
Calgary	$ 9.28	$23.74	39.0
Regina	$ 8.30	$20.85	40.0
Winnipeg	$ 7.50	$20.00	38.0
Ottawa	$10.70	$34.45	31.0
Rimouski	$12.80	$38.85	33.0
Moncton	$12.05	$35.45	34.0
Halifax	$13.10	$37.50	35.0
Charlottetown	$12.60	$38.30	33.0
St. John's	$13.15	$41.00	32.0

Note: Includes rental for a rotary-dial telephone set and, where applicable, EAS

With respect to usage, results from a 1983 Bell Canada Study[2] are summarized in Table 2.2. These results are similar to those of other telephone companies as well as those of a 1985 survey of telephone users commissioned by the Government of Ontario.[3] The Bell Canada study showed that usage by a single-line business customer, as measured by frequency of calling, is about twice that of a residence customer. As measured by call minutes, business usage is only 7 per cent higher, reflecting the much shorter duration of an average business call. Business calls are, however, more concentrated in peak calling periods.

Rate Groups

Canadian telephone companies classify their exchange areas by rate group. The charge for local service generally depends on the number of other subscribers that can be reached without incurring long-distance charges. Basic monthly rates increase with rate group size, that is, with the number of subscribers in the "toll free" calling area.

In Bell, Manitoba Telephone System, MT&T, Island Tel, Newfoundland Tel and Terra Nova Tel territories, rate groups are based on total telephone numbers (TTN) for the toll free calling area of an exchange. The companies determine the TTN count by adding up the telephone number count of defined classes of

TABLE 2.2
Local Usage — Residence versus Business

Class of Service	Monthly Average*			Frequency**				Duration (mins.)*			
	Freq.(!)	Duration(!)	Call Min.	Avg.	Median	Max.	% Avg.	Avg.	Median	Max.	% Avg.
Single-Line Residence	115	4.1	472	116	90	926	61	4.3	1.3	8.6 hrs.	44
Single-Line Business	229	2.2	504	216	162	1 850	63	2.2	1.0	6.6 days	52(#)
Multi-line Bus.(Key)	292	2.1	613	280	232	1 883	60	2.1	1.1	7.9 hrs.	48(#)
PBX	556	2.8	1 157	529	259	6 079	68	2.8	1.4	32.4 hrs.	41(#)

Legend:

* Seven month average (April - October 1983)
** October 1983
\# Percentage of calls less than one minute
! Frequency = No. of calls; Duration in minutes

Source: Bell Canada, "Subscriber Line Usage Study," 1983.

services for an exchange. In AGT and NBTel territories, rate groups are based on the number of main stations. SaskTel's rate groups are generally based on population. B.C. Tel, NorthwesTel, Québec-Tél and Télébec determine rate groups on the basis of the number of access lines.

When extended area service (EAS)* is provided, the rate group assignment of an exchange area is adjusted as follows: In Bell Canada, B.C. Tel, AGT and Télébec territories, a weighting factor is employed to give a weighted count. The weighted count for an exchange is the telephone count for the exchange plus the count for each other exchange in its local calling area times a weighting factor that is based on and increases with the rate-centre-to-rate-centre distance between the exchanges. Under this weighting approach, the telephone count of an exchange for rate group purposes is higher than the actual count of telephones. Accordingly, suburban exchanges in large metropolitan areas fall into the highest rate groups and subscribers consequently often pay rates higher than those in adjoining metropolitan areas. In the case of Manitoba Telephone System, Québec-Tél, MT&T, NBTel, Island Tel and Newfoundland Tel, the telephone count includes the combined count for the two or more exchange areas within which telephone service is provided without long-distance charges. With Terra Nova Tel, the rate group assignment of an exchange is not changed as a result of having EAS. In SaskTel territory, when a community is provided with EAS, it is assigned the rate group of the larger exchange and customers in the EAS community are charged an EAS surcharge. (NorthwesTel does not provide EAS.)

b) Long-distance service

Value of service is also a consideration in long-distance rating, although to a lesser extent than in local service. For example, the degree of distance sensitivity of long-distance rates may in part reflect value of service to the extent that consumers perceive longer distance calling to be only slightly more valuable to them than shorter distance calling (see section 2.3.3 below).

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* See section 2.3.4 for a detailed description of EAS.

2.3.2 Company-Wide Averaging

Company-wide averaging means that rates for services with similar features are the same throughout a telephone company's operating territory and regardless of the type of terrain, location, technology employed and so on. Newfoundland Tel, in particular, points out that system-wide rate averaging is supported by its enabling legislation. An example of company-wide averaging is that within an exchange all subscribers pay the same local exchange service rate for a given class of service, regardless of their usage or distance from the telephone company central office. As a further example, a rate group 4 customer in the Fraser Valley in B.C. Tel territory, where the cost of providing service is relatively low, pays the same price as a rate group 4 customer in northern B.C., where the cost of providing the same grade of service is much higher.

In the case of long-distance services, telephone company charges are independent of route. For example, a 100-mile MTS call from Winnipeg is rated the same as a 100-mile MTS call from Churchill. This practice is termed "route averaging". Presently, all Canadian telephone companies use route averaged rating for most long-distance services.

There are two exceptions to the principle of company-wide rate averaging. First, long-distance rates in the remote northern areas of Bell Canada's territory, where rail and road links with the south do not exist, are tariffed under a separate schedule. The rates for a five-minute customer-dialed regular charge call range from 16 per cent (23-30 mileage band) to 4 per cent (401 miles and over) lower than the rate for a comparable call elsewhere in Bell Canada's territory.* Second, a charge known as an "other line" rate applies, in addition to the standard long-distance charge, to calls originating from certain high-cost areas such as the Gaspé region served by Québec-Tél and Télébec and terminating in Bell Canada territory or vice versa. For calls originating in Bell Canada territory and terminating in Québec-Tél or Télébec territory, under the applicable traffic agreement, other line charges are collected by Bell Canada and forwarded to them.

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* The practice of setting separate, lower rates for the Remote North was first implemented in 1978 because the CRTC was concerned with the level of telephone service costs borne by these subscribers. The extent to which these subscribers depend on long-distance service due to population dispersal and distance from essential services was also a consideration.

2.3.3 Flat Rates versus Distance and Usage-Sensitive Rates

Distance sensitivity refers to how rates change as a function of distance. At one extreme, rates could be constant or "flat" over all distances. Such rates are distance-insensitive and they are sometimes referred to as postalized rates. All Canadian telephone companies charge for basic local service primarily on a flat-rate basis.*

Alternatively, rates may be distance sensitive, as is the case with long-distance rates. However, it should be noted that long-distance rates do not increase directly in proportion to distance. For example, the trans-Canada MTS rate applicable to Bell Canada customers for a five-minute call of 10 miles is $0.94; at 100 miles, it is $2.49 and at 1 000 miles, $5.00. As the distance increases a hundredfold from 10 to 1 000 miles, the rate increases only about four times. Rates for other types of long-distance services follow the same pattern.

Figure 2.1 shows the rates for Bell's trans-Canada service and various US long-distance services. It indicates that the US rates are far less distance sensitive than trans-Canada rates. In part this reflects a recent trend in the United States to reduce the distance sensitivity of long-distance rates.

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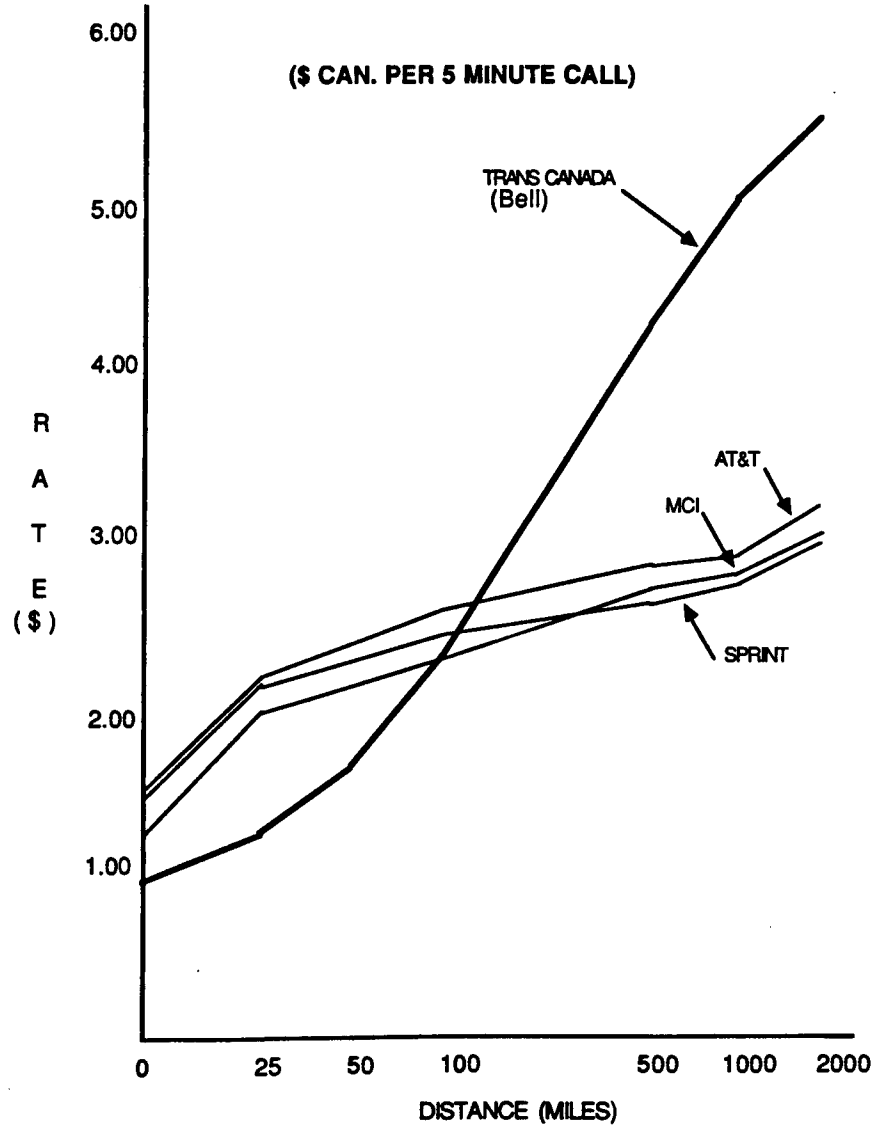
* In Bell, B.C. Tel, NBTel and MT&T territories, a measured service is available to individual-line business customers in large exchange areas. For Bell business subscribers in rate group 7 and above (telephone number count over 15 000), measured rates consist of a fixed component, 65 per cent (rate group 7) to 55 per cent (rate group 19) of the flat rate, including an originating call allowance of from 75 (rate group 7) to 195 (rate group 19) calls. Additional calls are priced at 9.2¢ each. There are no restrictions on the duration, time of day, or day of week of calls. B.C. Tel business subscribers in rate group 8 (access line count over 145 000) and above may subscribe to measured service. The basic charge is 54 per cent of the flat rate. It includes 50 originating calls with each additional call charged at 12¢ each. MT&T offers measured service to business customers in rate group 4 and above (with total telephone numbers over 6 000) for a basic charge that amounts to 75 to 80 per cent of the flat rate, with 50 free calls and 9¢ for each additional call. NBTel's measured service is priced on a similar basis. These services are not widely used.

FIGURE 2.1
Comparison of Canadian and US Long-Distance Rates
(December 1985)



Source: Telephone Company General Tariffs.

2.3.4 Extended Area Service

Extended area service (EAS) allows customers located in neighbouring exchanges to call one another without incurring long-distance charges (two-way EAS). In some cases, this toll free calling may be in one direction only, usually from a suburban exchange to a large urban exchange area but not vice versa (one-way EAS).

The telephone exchanges and lines with EAS in 1984 are summarized in Table 2.3. for telephone companies across Canada. The percentage of exchanges having EAS varies among telephone companies. For most companies a majority of exchanges have EAS. Turning to the percentage of lines with EAS, these are substantially higher; most telephone companies report over 80 per cent of lines with EAS.

However, Table 2.3 does not provide a full picture of EAS across Canada. For instance, it does not indicate the extent of either the number of exchanges or the number of subscribers that those in a given exchange with EAS can reach. The table therefore cannot be taken to indicate the overall availability of EAS among the different telephone companies. SaskTel is not accepting new applications for EAS. It intends to replace any expansion of EAS with Dialpac* service, which was recently approved by the Saskatchewan Public Utilities Review Commission.

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* Dialpac is an optional calling plan whereby residence and business individual-line customers in smaller communities may obtain a long-distance credit package to be applied against direct distance dialed (DDD) calls to a preselected nearby exchange. Dialpac subscribers can select either a 30- or 40-minute package at a rate which is, on average, 53 per cent less than the regular daytime DDD rate. Subscribers can obtain Dialpac service to a maximum of three exchanges within a 40-mile radius, with a limit of one package per exchange. All calls in excess of the designated time limit are charged at the normal DDD rates. Other optional calling plans are also available in the territories of NBTel, Bell Canada and B.C. Tel.

TABLE 2.3
Extended Area Service -- Telecom Canada
& Associate Member Companies (1984)

Company	No. of Exchanges			Netwk. Access Serv. Lines (000)		
	Total	w. EAS	% w. EAS	Total	w. EAS	% w. EAS
Nfld Tel	80	42	53.0	141	119	84.0
Island Tel	26	26	100.0	51	51	100.0
MT&T	151	140	93.0	371	358	96.0
NBTel	101	77	76.0	314	274	87.0
Bell Canada	966	846	88.0	6 823	6 777	99.0
Québec-Tel	136	119	88.0	216	207	96.0
Manitoba Tel	237	127	54.0	522	428	82.0
SaskTel	342	68	20.0	497	333	67.0
AGT	434	284	65.0	746	718	96.0
B.C. Tel	297	205	69.0	1 475	1 254	85.0

Source: Telecom Canada Statistics, 1984.

At present, the criteria for introducing EAS are quite similar across the country. They include the following:

- A community of interest exists. This is sometimes expressed in terms of the extent of calling between two exchanges.
- The distance between the exchanges' rate centres (normally the main switching centre in an exchange) does not exceed a certain distance.
- In some jurisdictions the exchanges have to be contiguous and a majority of customers, whose basic local rates would increase as a result of receiving EAS, must approve the service.

EAS can be regarded as a service that provides unlimited short-haul long-distance calling for a relatively low monthly charge or for no charge at all. In the case of Bell Canada, B.C. Tel, AGT and Télébec, such a charge is not explicit. Nonetheless, an increased charge to subscribers is usually reflected in the weighting factor and the combined telephone count used in assigning an exchange to a particular rate group. In Manitoba Telephone System, SaskTel, MT&T, NBTel and Island Tel territories, when EAS is introduced to an exchange area customers normally pay a higher monthly rate because the exchange is shifted into a higher rate group. In addition to paying a higher monthly rate for EAS, customers in SaskTel territory pay an EAS surcharge.

Terra Nova Tel and Québec-Tél levy supplemental EAS charges that depend on distance and the number of subscribers reached. In Newfoundland Tel territory, the telephone count for the purpose of rate group assignment includes the total telephone numbers of the other exchanges that can be reached without incurring long-distance charges. In addition, a monthly charge that reflects distance applies.

Information provided to the examination indicates that the introduction of EAS brings about substantial traffic stimulation, often in the order of two to five times, which requires expansion of the telephone company's public-switched network.[4] When EAS is introduced, however, additional revenue is obtained from increases in fixed monthly local rates. In order to assess whether EAS is desirable, other factors, including facility-related costs (both fixed and variable) and changes in long-distance revenues, have to be considered.

Many telephone companies successfully phase in EAS projects with other required capital expenditures. This approach allows a piggy-back effect whereby a little extra capital investment at the time provides for both the required changes plus EAS capabilities, thereby greatly reducing EAS-related costs. The experience of some Canadian telephone companies, such as Québec-Tél, indicates that EAS can sometimes be introduced in a more cost effective manner when the service is implemented in conjunction with telephone-plant modernization programs.

Changes in long-distance revenue are the hardest item to predict. Certainly there are direct reductions in long-distance revenues from the two exchanges involved in providing EAS. However, this reduction may in part be offset by replacement calling.*

Taking the above factors into consideration, it may be possible to have an extensive EAS program that would provide benefits to the exchanges involved without placing a significant financial burden on the general body of subscribers. There is no doubt an economic limit to expanding the availability of extended area service. It is possible that a number of jurisdictions have reached that limit. In such cases, unless new cost-recovery schemes are implemented in the early years of conversion, it is likely that further expansion of EAS would no longer be an appropriate option.

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* Replacement calling refers to the long-distance calls placed to other locations after implementation of EAS by subscribers who have decided to use all or some of their EAS-associated savings to make additional long-distance calls.

2.3.5 Discounts

Discounts are offered by telephone companies on long-distance services as follows:

MTS

Regular MTS rates for all telephone companies apply for business day customer-dialed calling. At other times of the day, various discounts apply. For intra-company calls, the discount structures are as follows:

1. Most companies:

Period	Companies			
	A	B	C	D
	(%)	(%)	(%)	(%)
Evening	35.0	35.0	30.0	35.0
Sunday	35.0	35.0	30.0	50.0
Night	60.0	50.0	50.0	60.0

A - SaskTel, Nfld Tel, Terra Nova Tel, B.C.Tel, NorthwesTel
B - Manitoba Telephone System, NBTel
C - Island Tel, MT&T
D - AGT

- Evening rate: applies Monday-Saturday, 6:00 P.M. - midnight except B.C. Tel (5:00 P.M. - 11:00 P.M.), NorthwesTel (6:00 P.M. - 11:00 P.M.), Island Tel (6:00 P.M. - 10:00 P.M.).

- Night rate: applies everyday (midnight - 8:00 A.M.) except B.C. Tel (11:00 P.M. - 8:00 A.M.), NorthwesTel (11:00 P.M. - 8:00 A.M.), Island Tel (10:00 P.M. - 8:00 A.M.).

2. Bell Canada:

	Time of day	% reduction	day of week
Evening	(6:00 P.M. - 11:00 P.M.)	33 1/3	Monday-Friday
		50	Sunday
Night	(11:00 P.M. - 8:00 A.M.)	66 2/3	Daily
Saturday	(Noon - 11:00 P.M.)	66 2/3	
Sunday	(8:00 A.M. - 6:00 P.M.)	66 2/3	

3. Télébec and Québec-Téléphone:

	Time of day	% reduction	day of week
Evening	(6:00 P.M. - 11:00 P.M.)	33 1/3	Monday-Friday
Night	(11:00 P.M. - 8:00 A.M.)	66 2/3	Daily
Saturday	(8:00 A.M. - 11:00 P.M.)	66 2/3	
Sunday	(8:00 A.M. - 11:00 P.M.)	66 2/3	

For trans-Canada calls, the discount structure is the same as that applicable to intra-company calls for the group A companies listed above. Regarding discount periods for trans-Canada calls, the evening rate applies Monday to Saturday, from 6:00 p.m. to 11:00 p.m., and the night rate applies daily between 11:00 p.m. and 8:00 a.m. The exception is for calls originating from Saskatchewan. For these calls, evening and night rates are in effect from 6:00 p.m. to midnight and from midnight to 8:00 a.m., respectively. For all companies, the Sunday rate applies from 8:00 a.m. to 6:00 p.m.

As can be seen, the rates for evening, night and weekend calling can be as such as 66 2/3 per cent less than day calling. These discounts generally benefit residence as opposed to business subscribers since residence subscribers are normally better able to delay making calls until the discount periods.

Some telephone companies offer other arrangements that provide MTS discounts. Under one such arrangement, subscribers may pay a flat monthly subscription fee and, in return, receive a discount on total MTS charges. Bell Canada's Teleplus service falls into this category. At present, Bell's Teleplus-200 subscription service is being offered to selected residence and business customers on a trial basis. Discounts of 20 per cent are applied to customer-dialed calls terminating in Canada made at any time after regular MTS off-peak calling discounts have been calculated. Under one of the two service options, the monthly subscription fee is $10.00, and the maximum monthly billing eligible for this additional discount is $400.

Another arrangement offered by Bell, B.C. Tel, SaskTel and NBTel may be considered an optional extended area service. Under this arrangement, subscribers typically pay a flat monthly fee and receive in return a discount on MTS calling to specific exchanges or areas within the operating area of the company. The discounts available to subscribers to these optional calling plans vary. As an example, under SaskTel's Dialpac service, the rate averages 53 per cent less than the regular daytime DDD rates.

Finally, services exist whereby a block of calling time, e.g. hourly, can be purchased at a flat monthly charge. As an example, Bell offers the message time-allowance plan (Econo-Pak) to residence customers. Under this plan, a customer purchases a block of time for customer-dialed long-distance calls made at a specified time of day (normally peak hours). With exceptions, the calls must terminate at one of the company's exchanges located within the same province. Therefore, the value of the discount depends on the calling pattern of the subscriber.

WATS and private lines

When a telephone company subscriber has a large amount of traffic, the subscriber can achieve significant savings by leasing WATS or private-line service. While MTS rates are usage sensitive, those for private lines are usage insensitive; WATS rates include both usage sensitive and insensitive components.

The extent of savings that can be derived from the use of private lines increases with use for two reasons. First, the telephone company tariffs apply lower per-circuit rates as the number of circuits leased increases. Second, the efficiency of circuit groups increases as the number of circuits increases. Therefore, subscribers can load more traffic on each circuit of a larger group than a smaller group, while maintaining the same grade of service.

For example, consider a subscriber with circuits between Toronto and Winnipeg. With six circuits and under normal circumstances, 4 200 five-minute calls could be carried at a cost of $18 000 per month or $4.50 per call. If the number of circuits is doubled to twelve, 11 550 calls can be carried (an increase by a factor of 2.75). Thus the increase in circuit efficiency will reduce the cost per call from $4.50 to $3.64.* Also, because of the increased number of circuits, the monthly cost per circuit drops from $3 135 to $2 550, a saving of 19 per cent. This further reduces the cost per call to $2.64. While the rate structure for WATS is different than for private lines, the same two-fold savings can be realized. In general, private lines offer a greater discount relative to MTS and WATS.

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* These results are based on a typical distribution of traffic load and grade of service. Under other assumptions, the results would be different.

2.3.6 Cost Recovery

Rates for specific services, in particular basic local services, do not necessarily reflect the underlying costs of providing these services. In the aggregate, however, telephone company rates are set at levels that result in sufficient revenues to recover all associated costs.

2.3.7 Technology-Based Rates

In the provision of long-distance services, the telephone companies use a variety of technologies such as microwave, fiber optics, coaxial cable and satellites. However, while these technologies have differing cost and performance characteristics, the rates for long-distance services are generally the same no matter what facility is used and, typically, the user cannot specify over which facility the service is provided.

2.3.8 Standard Grade-of-Service and Distance Charges

In Bell, B.C. Tel, Island Tel, MT&T, NorthwesTel and Terra Nova Tel territories, individual-line and two-party line services are the grades of local service normally provided within the base rate area of an exchange, where provision of services is more economical than elsewhere (see section 2.1.1). Outside the base rate area, the standard grade is usually four-party service. These telephone companies will also provide individual or two-party line service outside the base rate area but within the exchange area. In such cases, distance charges apply in addition to the basic rates. Distance charges vary not only with distance, but with rate group and grade of service as well.

In AGT, Manitoba Telephone System and SaskTel territories, the standard grade of service normally provided within the base rate area is individual-line service (ILS). Beyond that, service for up to four parties per line is provided as the normal grade of service. Distance charges apply when ILS is provided beyond the base rate area.

In the case of NBTel, customers are encouraged to subscribe to ILS in all areas of its serving territory. ILS and two-party service are universally available throughout Newfoundland Tel's territory. Similarly, in Québec-Tél

serving areas, ILS and two-party service are the standard grades of service provided to urban customers. For rural customers, it is multi-party service with not more than four parties per access line.

SaskTel announced in March 1986 that it would be providing universal ILS to some 70 000 multi-party line subscribers in Saskatchewan over a five-year period. And during the 1986 provincial election compaign, the Government of Alberta promised to provide ILS to AGT's 100 000 rural party-line customers over a five-year period, at a cost of $500 million.

2.3.9 Non-Recurring Service Charges

Most Canadian telephone companies break down their service charges for work requested by a subscriber involving the installation, change, reconnection or change of location of basic local service into three or four elements. The total non-recurring service charge is the sum of the charges for each element, as applicable. The following charges may apply:

(1) administration charge -- applies for work done in processing a subscriber request;
(2) line connection charge;
(3) premises visit charge; and
(4) premises work charge.

Some companies, e.g. Newfoundland Tel, bundle items (3) and (4). Charges are applied uniformly across each company's operating territory, regardless of location. For most companies, charges for residence customers are lower than for business customers. These service charges are shown in Tables 2.4 and 2.5:

TABLE 2.4
Service Charges for Basic Local Residence Telephone Service
(December 1985)

Company	Administration	Connection	Premises Visit	Premises Work
Bell	$14.00	$14.50	$ 4.50	$ 4.75
B.C. Tel	$16.50	$ 7.00	$ 7.25	$11.75 !!
AGT *	—	$23.79	—	$ 4.76
SaskTel	$ 9.00	$ 6.00	$ 5.00	$10.00
Manitoba Tel #	—	$19.00	—	$12.50
NBTel	$ 7.50	$10.00	—	$24.00 ##
MT&T	$13.00	$10.00	—	$ 7.00 !
Island Tel	$16.25	$ 6.25 **	—	—
Nfld Tel	$11.00	$12.00	—	$12.00
Québec-Tél	$15.50	$17.00	$15.00	$13.45
Terra Nova Tel	$13.05	$16.20	$ 6.10	$ 6.10
NorthwesTel	$ 9.40	$ 8.90	$ 9.20	$ 9.20

TABLE 2.5
Service Charges for Basic Local Business Telephone Service
(December 1985)

Company	Administration	Connection	Premises Visit	Premises Work
Bell	$25.75	$22.25	$10.00	$31.25
B.C. Tel	$22.75	$14.50	$12.00	$35.50 !!!
AGT *	—	$33.30	—	$ 7.61
SaskTel	$16.00	$ 7.00	$ 8.00	$20.00 ***
Manitoba Tel #	—	$19.00	—	$12.50
NBTel	$ 7.50	$10.00	—	$24.00 ##
MT&T	$13.00	$10.00	—	$21.00 !
Island Tel	$21.25	$ 9.25 **	—	—
Nfld Tel	$14.00	$15.00	—	$19.00
Québec-Tél	$28.00	$25.00	$25.00	$20.00
Terra Nova Tel	$16.85	$21.00	$ 7.95	$ 7.95
NorthwesTel	$13.55	$12.80	$13.20	$18.15

Legend:

*	recalculated, service elements not unbundled
#	in addition, a work unit charge may apply
##	per visit
!	per activity
!!	installation or move; $9.75 for "change"
!!!	installation or move; $22.00 for "change"
**	per unit of work
***	per item

It is the position of the telephone companies that service charges for providing basic services are not compensatory. For example, NorthwesTel estimated in 1985 that the average cost across the company's operating area, excluding travel time, vehicular expense, airfares and charters required to service small communities not permanently staffed with NorthwesTel technicians were as follows:

	Cost	Rate (Residence)
Order Processing	$24.00	$ 9.40
Line Connections	$22.00	$ 8.90
Premises Visit	$11.00	$ 9.20
Premises Work	$48.00	$ 9.20.

2.4 Rate Levels Across Canada

2.4.1 Local Rates

This section provides comparisons of basic local service rates across Canada by telephone company. As described in Section 2.1, there are differences in the basic local service package in respect of whether the primary telephone set is included or not. For comparative purposes, in this section the rental for a rotary-dial telephone set is included. Subsection (a) compares local rates by selected levels of telephone count. Subsection (b) provides a summary of basic local rates by telephone company.

a) Detailed comparisons by selected telephone count levels

For the purpose of charging customers for local service, Canadian telephone companies classify each local exchange service area by rate group. (The practice of defining rate groups was described in section 2.3.1.) The basis on which rate groups are determined varies considerably from one company to another, as is shown in Appendix A. It seems that each company has defined its rate group scale according to its own needs, and some have occasionally revised their scale in order to respond to a changing situation and to produce a positive impact on basic service revenues. Obviously, no concerted effort has been made within the industry either to rationalize or standardize its practice with respect to rate group definition.

For the purpose of determining local service rates for customers, Canadian telephone companies also classify services as residence or business. The residence classification applies when the service is used primarily for domestic or family purposes. When the service is used primarily for commercial or related purposes, the business rate applies. For comparative purposes, residence and business rates are separately identified.

Furthermore, the local service rate paid by a customer differs depending on whether it is individual-line or party-line service. Under the value-of-service principle practised by Canadian telephone companies, the rates for ILS are usually higher. For comparative purposes, individual and party-line rates are listed separately.

In addition, the methods used to determine the applicable rates in exchange areas where extended area service is provided are not uniform for all companies. Consequently, the impact of EAS on subscriber rates varies substantially from one company to another. For this reason, rate comparisons with and without EAS are made separately.

In view of the foregoing, it is difficult to make valid comparisons among local rates charged by telephone companies across Canada and it can be misleading to try to compare rates by using rate groups alone. However, valid comparisons may be made by establishing the monthly rate that each company would apply to a specific exchange (according to the terms and conditions set out in its General Tariff) if it were required to serve that exchange. Eight illustrative exchanges whose parameters are based on real data were chosen and the applicable rate for each has been determined in accordance with telephone company General Tariffs.

In order to obtain an interesting spread, exchanges in which the local service area takes in from 500 to more than 150 000 access lines were selected. The tables and graphs in Appendix B give the applicable rate grids and show the relationship among some of the rates. Each set of rates is shown in two tables: The first gives the rates for an exchange with extended area service; the second provides the rates that would apply to the same exchange without extended area service. Since companies provide party-line service under a variety of terms and conditions, the comparative graphs are limited to individual and two-party service for residence subscribers and ILS for business subscribers.

Observations on discrepancies in rates

Discrepancies in the rates of the various companies are substantial, exceeding 100 per cent in most cases and reaching 150 per cent and over for the individual-line business service. The ratios between grades of service (individual-line or two-party) and between classes of customers (residence or business) also vary considerably. For residence service, two-party rates range from 60 to 96 per cent of ILS rates. For business service, the corresponding ratio ranges from 58 to 95 per cent. The ratio between the residence service rate and the business service rate ranges from 31 to 65 per cent.

In the examples considered, the "surcharge" for extended area service is between 0 and 83 per cent of the basic service rate (ile. the local rate applicable in an exchange without extended area service) for residence subscribers. These percentages range from 0 to 184 per cent for business service.

b) Summarized basic local rate comparisons

This subsection is made up of a series of tables and figures summarizing monthly basic local service rates across Canada by telephone company and by telephone count. Tables 2.6 and 2.7 provide the residence individual-line rates in December 1985 and July 1980, respectively. Tables 2.8 and 2.9 capsulize the same information for business customers. Figure 2.2 presents residence two-party rates in December 1985 as a percentage of residence ILS rates. Figure 2.3 shows December 1985 multi-party business rates as a percentage of business ILS rates.

TABLE 2.6
Monthly Basic Residence Exchange Service Rates, Individual-Line (December 1985)

Telephone Count	Nfld. Tel *	Isl. Tel *	MT&T *	NB Tel ***	Bell *	*Que. Tel* **/#	Man. Tel *	SaskTel !	AGT ***	BC Tel **
500	8.75	9.50	11.00	9.80	7.15	7.40	4.75	5.70	7.28	8.20
1,000	8.75	9.50	11.00	9.80	7.15	7.60	5.00	5.70	7.56	8.20
1,500	8.75	9.50	11.40	9.95	7.15	7.60	5.25	5.70	7.56	8.80
2,000	8.75	10.25	11.40	9.95	7.65	7.80	5.25	5.70	7.56	8.80
3,000	8.75	10.25	11.40	10.25	7.65	8.00	5.25	5.70	7.75	8.80
4,000	8.75	10.25	11.80	10.25	7.95	8.20	5.95	7.10	7.75	8.80
5,000	9.90	10.25	11.80	10.55	7.95	8.20	5.95	7.10	7.75	9.35
7,500	9.90	11.90	12.20	10.55	7.95	8.40	6.30	7.10	7.99	9.35
10,000	9.90	11.90	12.20	10.85	8.65	8.60	6.30	7.10	7.99	9.35
12,500	9.90	11.90	12.20	10.85	8.65	8.80	6.30	7.10	8.37	9.35
15,000	10.85	11.90	12.20	11.10	8.65	9.00	6.30	7.10	8.37	9.95
17,500	10.85	12.60	12.20	11.10	8.95	9.15	6.30	7.10	8.37	9.95
20,000	10.85	12.60	12.20	11.45	8.95	9.15	6.75	7.10	8.37	9.95
25,000	10.85	12.60	12.65	11.45	8.95	9.30	6.75	7.10	8.37	9.95
30,000	11.90	12.60	12.65	11.45	8.95	9.50		7.10	8.37	9.95
35,000	11.90		12.65	11.45	8.95	9.70		7.10	8.37	10.50
40,000	11.90		12.65	11.45	9.55	9.70		7.10	8.37	10.50
45,000	11.90		12.65	11.75	9.55	10.30		7.10	8.37	10.50
50,000	11.90		12.65	11.75	9.55			7.10	8.37	10.50
75,000	13.15		13.10	12.05	9.55			8.30	8.71	10.50
100,000			13.10		10.30			8.30	8.71	11.10
150,000			13.10		10.30			8.30	8.71	11.70
300,000					10.70		7.50		8.71	11.70
500,000					10.70				9.28	12.30
1,000,000					11.15				10.37	12.85
1,500,000					12.20				11.47	13.50
2,000,000					13.15				12.61	14.00
2,500,000					14.15				13.70	14.00
3,000,000					15.25				14.80	14.00
3,750,000					16.30				15.94	14.60
4,500,000					17.40				15.94	15.55
5,250,000					18.45				15.94	15.55
Set Rental		$1.35	$1.45		$1.55	$0.95			$1.19	$1.95
Sample Rate	St. John's	Charlotte-town	Halifax	Moncton	Ottawa	Rimouski	Winnipeg	Regina	Calgary	Victoria

Note: Rate shown includes rental for a rotary-dial telephone set

Telephone count :-

* By Total Telephone Numbers; Bell Canada(weighted)

** By Total Access Lines; B.C. Tel(weighted)

*** By Total Main Stations; AGT(weighted)

! Based on population

\# Urban rates; rate shown excludes EAS charge of $1.50 to $3.50. Rimouski augmented rate = $9.50 + $3.30 = $12.80.

TABLE 2.7
Monthly Basic Residence Exchange Service Rates, Individual-Line (July 1980)

Telephone Count	Nfld. Tel *	Isl. Tel *	MT&T *	NB Tel ***	Bell *	Que. Tel #	Man. Tel ***	SaskTel ***	AGT ***	BC Tel **
500	6.90	6.50	8.35	7.20	4.95	7.40	3.65	4.30	4.85	5.25
1,000	6.90	6.80	8.35	7.20	4.95	7.60	3.85	4.30	5.05	5.25
1,500	7.20	6.80	8.65	7.35	4.95	7.60	4.10	4.30	5.05	5.65
2,000	7.20	7.40	8.65	7.35	5.30	7.80	4.10	4.30	5.05	5.65
3,000	7.20	7.40	8.65	7.65	5.30	8.00	4.10	4.30	5.25	5.65
4,000	7.20	8.00	8.95	7.65	5.55	8.20	4.30	5.30	5.25	5.65
5,000	7.20	8.00	8.95	7.90	5.55	8.40	4.30	5.30	5.25	6.05
7,500	7.80	8.60	9.25	7.90	5.55	8.40	4.60	5.30	5.50	6.05
10,000	7.80	8.60	9.25	8.20	6.00	8.60	4.60	5.30	5.50	6.05
12,500	7.80	9.20	9.25	8.20	6.00	8.80	4.85	5.30	5.80	6.05
15,000	7.80	9.20	9.25	8.45	6.00	9.00	4.85	5.30	5.80	6.45
17,500	7.80	9.20	9.25	8.45	6.25	9.15	4.85	5.30	5.80	6.45
20,000	7.80	9.20	9.25	8.75	6.25	9.15	4.85	5.30	5.80	6.45
25,000	7.80		9.60	8.75	6.25	9.30	4.85	5.30	5.80	6.45
30,000	8.40		9.60	8.75	6.25	9.50	5.15	5.30	5.80	6.45
35,000	8.40		9.60	8.75	6.25	9.70	5.15	5.30	5.80	6.85
40,000	8.40		9.60	8.75	6.65	9.70	5.15	5.30	5.80	6.85
45,000	8.40		9.60	9.05	6.65			5.30	5.80	6.85
50,000	8.40		9.60	9.05	6.65			5.30	5.80	6.85
75,000	8.90		9.95	9.70	6.65			6.20	6.10	6.85
100,000	9.40		9.95		7.15			6.20	6.10	7.25
150,000			9.95		7.15			6.20	6.10	7.65
300,000					7.50		5.50		6.10	7.65
500,000					7.50		5.50		6.60	8.05
1,000,000					7.80				7.60	8.45
1,500,000					8.55				8.60	8.85
2,000,000					9.20				9.60	9.25
2,500,000					9.90				10.60	9.25
3,000,000					10.70					9.25
3,750,000					11.45					9.65
4,500,000					12.20					10.25
5,250,000										10.25
Sample Rate	St. John's	Charlotte-town	Halifax	Moncton	Ottawa	Rimouski	Winnipeg	Regina	Calgary	Victoria

Note: Rate shown includes rental for a rotary-dial telephone set

Telephone count :-

* By Total Telephone Numbers

** By Weighted Main Stations

*** By Total Main Stations

\# Urban rates as at 1 July, 1981; rate shown excludes EAS charge of $1.50 to $3.50. Rimouski augmented rate = $9.30 + $2.25 = $11.55.

Table 2.8
Monthly Basic Business Exchange Service Rates, Individual-Line (December 1985)

Telephone Count	Nfld. Tel *	Isl. Tel *	MT&T *	NB Tel ***	Bell *	Que. Tel **/#	Man. Tel *	SaskTel !	AGT ***	BC Tel **
500	19.00	18.25	17.00	18.50	14.70	13.00	8.65	10.95	12.13	16.10
1,000	19.00	18.25	17.00	18.50	14.70	14.05	9.30	10.95	14.13	16.10
1,500	19.00	18.25	21.15	20.70	14.70	14.05	10.30	10.95	14.13	18.45
2,000	19.00	21.90	21.15	20.70	16.70	15.30	10.30	10.95	14.13	18.45
3,000	19.00	21.90	21.15	22.05	16.70	16.50	10.30	10.95	16.18	18.45
4,000	19.00	21.90	24.15	22.05	18.80	18.00	11.25	15.40	16.18	18.45
5,000	26.40	21.90	24.15	23.45	18.80	18.00	11.25	15.40	16.18	21.00
7,500	26.40	32.20	27.55	23.45	18.80	19.50	12.60	15.40	18.22	21.00
10,000	26.40	32.20	27.55	25.50	21.35	21.05	12.60	15.40	18.22	21.00
12,500	26.40	32.20	27.55	25.50	21.35	22.15	14.15	15.40	20.27	21.00
15,000	31.80	32.20	27.55	27.45	21.35	23.25	14.15	15.40	20.27	23.55
17,500	31.80	38.30	27.55	27.45	24.35	24.35	14.15	15.40	20.27	23.55
20,000	31.80	38.30	27.55	29.80	24.35	24.35	14.15	15.40	20.27	23.55
25,000	31.80	38.30	32.50	29.80	24.35	25.20	14.15	15.40	20.27	23.55
30,000	36.80	38.30	32.50	29.80	24.35	26.05	16.40	15.40	20.27	23.55
35,000	36.80		32.50	29.80	24.35	27.15	16.40	15.40	20.27	26.20
40,000	36.80		32.50	29.80	27.90	27.15	16.40	15.40	20.27	26.20
45,000	36.80		32.50	32.60	27.90	30.80		15.40	20.27	26.20
50,000	36.80		32.50	32.60	27.90			15.40	20.27	26.20
75,000	41.00		37.50	35.45	27.90			20.85	22.27	26.20
100,000			37.50		31.45			20.85	22.27	28.75
150,000			37.50		31.45			20.85	22.27	31.85
300,000					34.45		20.00		22.27	31.85
500,000					34.45		20.00		23.74	34.95
1,000,000					37.30				26.78	38.10
1,500,000					40.60				29.92	41.25
2,000,000					43.75				33.02	44.40
2,500,000					47.05				36.06	44.40
3,000,000					50.35				39.44	44.40
3,750,000					53.65				43.15	47.60
4,500,000					56.85				43.15	50.80
5,250,000					60.20				43.15	50.80
Set Rental		$1.35	$1.45		$2.35	$0.95			$1.19	$2.55
Sample Rate	St. John's	Charlotte-town	Halifax	Moncton	Ottawa	Rimouski	Winnipeg	Regina	Calgary	Victoria

Note: Rate shown includes rental for a rotary-dial telephone set

Telephone count :-

* By Total Telephone Numbers; Bell Canada(weighted)

** By Total Access Lines; B.C. Tel(weighted)

*** By Total Main Stations; AGT(weighted)

! Based on population

\# Urban rates; rate shown excludes EAS charge of $2.25 to $12.50.
Rimouski augmented rate = $26.05 + $12.00= $38.05.

TABLE 2.9
Monthly Basic Business Exchange Service Rates, Individual-Line (July 1980)

Telephone Count	Nfld. Tel *	Isl. Tel *	MT&T *	NB Tel ***	Bell *	Que. Tel #	Man. Tel ***	SaskTel ***	AGT ***	BC Tel **
500	14.25	11.05	12.95	12.35	9.45	13.00	6.50	7.85	7.15	9.60
1,000	14.25	12.70	12.95	12.35	9.45	14.05	7.05	7.85	8.90	9.60
1,500	15.75	12.70	16.20	14.40	9.45	14.05	7.85	7.85	8.90	11.15
2,000	15.75	15.30	16.20	14.40	10.85	15.30	7.85	7.85	8.90	11.15
3,000	15.75	15.30	16.20	15.70	10.85	16.50	7.85	7.85	10.65	11.15
4,000	15.75	18.70	18.55	15.70	12.30	18.00	8.70	11.00	10.65	11.15
5,000	15.75	18.70	18.55	17.00	12.30	18.00	8.70	11.00	10.65	12.75
7,500	19.75	22.65	21.15	17.00	12.30	19.50	9.80	11.00	12.40	12.75
10,000	19.75	22.65	21.15	18.95	14.05	21.05	9.80	11.00	12.40	12.75
12,500	19.75	27.00	21.15	18.95	14.05	22.15	11.15	11.00	14.15	12.75
15,000	19.75	27.00	21.15	20.80	14.05	23.25	11.15	11.00	14.15	14.40
17,500	19.75	27.00	21.15	20.80	16.15	24.35	11.15	11.00	14.15	14.40
20,000	19.75	27.00	21.15	23.00	16.15	24.35	11.15	11.00	14.15	14.40
25,000	19.75		25.00	23.00	16.15	25.20	11.15	11.00	14.15	14.40
30,000	23.50		25.00	23.00	16.15	26.05	13.05	11.00	14.15	14.40
35,000	23.50		25.00	23.00	16.15	27.15	13.05	11.00	14.15	16.05
40,000	23.50		25.00	23.00	18.60	30.80	13.05	11.00	14.15	16.05
45,000	23.50		25.00	25.65	18.60			11.00	14.15	16.05
50,000	23.50		25.00	25.65	18.60			11.00	14.15	16.05
75,000	25.50		28.85	31.10	18.60			14.85	15.90	16.05
100,000	27.50		28.85		21.05			14.85	15.90	17.70
150,000			28.85		21.05			14.85	15.90	19.70
300,000					23.15		15.95		15.90	19.70
500,000					23.15				17.15	21.70
1,000,000					25.10				19.80	23.70
1,500,000					27.35				22.50	25.70
2,000,000					29.55				25.15	27.75
2,500,000					31.80				27.80	27.75
3,000,000					34.10					27.75
3,750,000					36.40					29.80
4,500,000					38.65					31.90
5,250,000										31.90
Sample Rate	St. John's	Charlotte-town	Halifax	Moncton	Ottawa	Rimouski	Winnipeg	Regina	Calgary	Victoria

Note: Rate shown includes rental for a rotary-dial telephone set

Telephone count :-

* By Total Telephone Numbers

** By Weighted Main Stations

*** By Total Main Stations

\# Urban rates as at 1 July, 1981; rate shown excludes EAS charge of $1.60 to $9.30. Rimouski augmented rate = $25.20 + $8.45 = $33.65.

FIGURE 2.2
Residence Two-Party Exchange Service Rates As Percentage of Individual-Line Service Rates (December 1985)

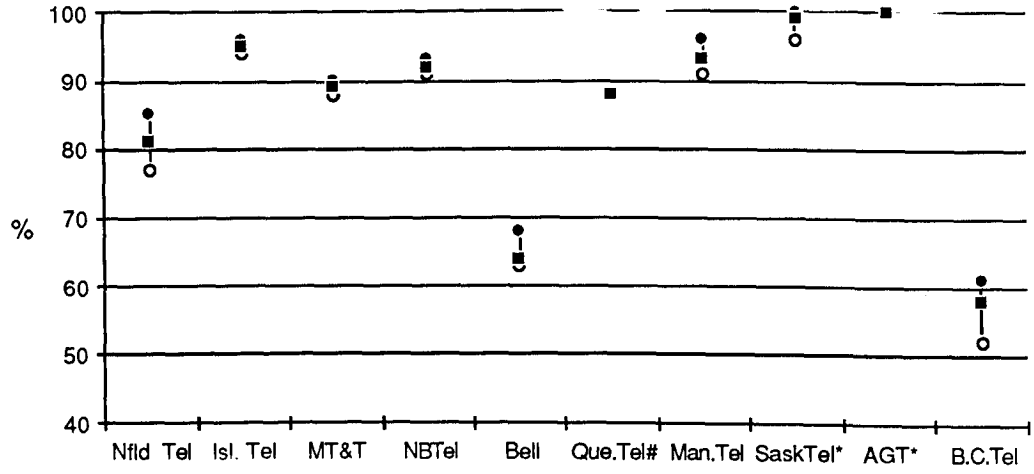
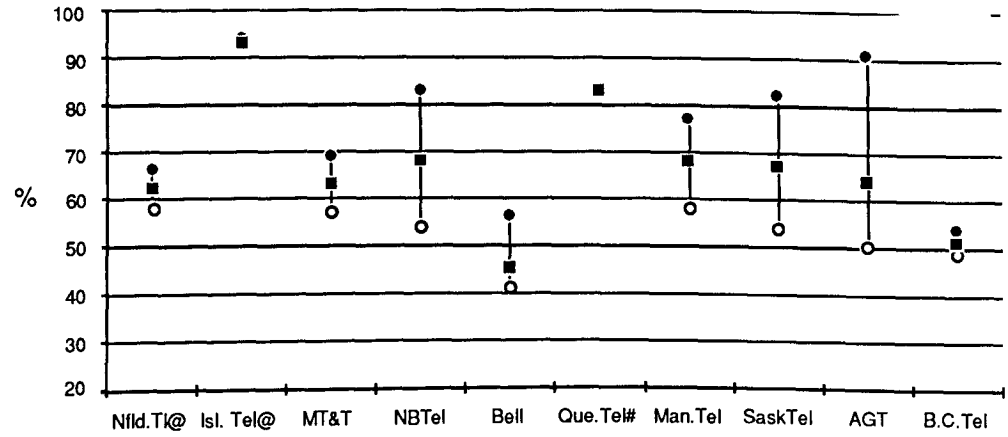


FIGURE 2.3
Business Multi-Party Exchange Service Rates As Percentage of Individual-Line Service Rates (December 1985)



Legend: ● High ○ Low ■ Avg.

* Multi-Party; Two-Party Service not furnished.

\# Urban, excludes EAS supplement of $1.50 to $3.50(residence) or $2.25 to $12.50(business).

@ Two-Party Service.

2.4.2 Rates for Long-Distance Services

While all telephone companies adhere to the same principles and practices when setting long-distance rates, the actual rate levels vary greatly from company to company. For each company there is at least one set of long-distance rates for intra-company calling and one for inter-company calling. There are also separate rate schedules for calling to the United States and overseas, and several companies have additional rate schedules for calls to adjacent companies.

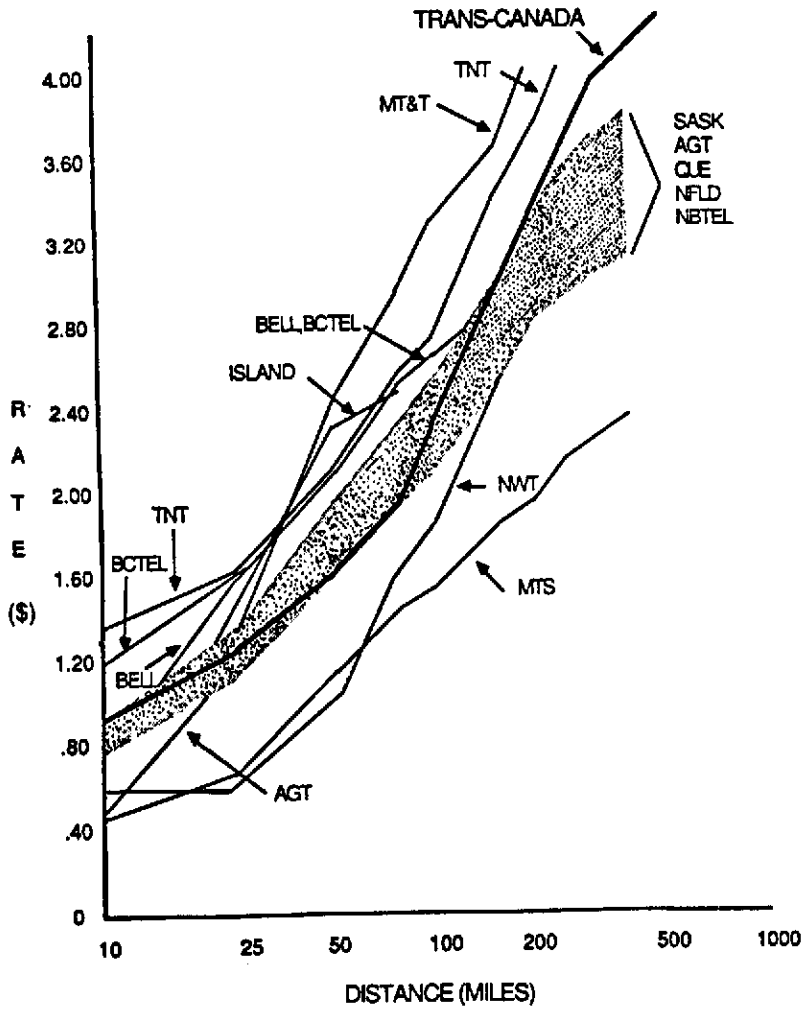
a) MTS rates

Rates for MTS are based on distance and duration. A single per-minute charge generally applies to all classes of calls and additional flat charges are applied by most telephone companies for call set-up -- for both customer-dialed and operator-assisted calls. MTS rates are somewhat distance sensitive but, typically, the rate for a 100-mile call is about one-half the rate for a 2 000-mile call.

Business day rates for the various companies and the inter-company rates are shown in Figure 2.4. The shaded area represents the average of all of the companies' rates plus and minus 10 per cent. The rates for SaskTel, AGT, Québec-Tél, Newfoundland Tel and NBTel lie within the shaded area. The trans-Canada rates shown apply to calls originating in Bell, B.C. Tel, SaskTel and Manitoba Telephone System territories to other Telecom Canada member companies. Different rates apply to trans-Canada calls originating in the territories of other telephone companies. Figure 2.4 and Table 2.10 provide comparisons of MTS rates at December 1985. Table 2.11 tabulates rates in July 1980.

As can be seen from Figure 2.4, there is a wide variation in MTS rates among the companies: Manitoba Telephone System has the lowest rate over most mileage bands. MT&T's rates are the highest over most distances, and they are about 100 per cent higher than those in Manitoba.

FIGURE 2.4
Message Toll Service Rates
(December 1985)



Note: For a five-minute customer-dialed, business day call

Source: Telephone Company General Tariffs

TABLE 2.10

Long-Distance, Two-Point Service Rates for Customer-Dialed Business Day, Three-Minute Duration Calls (December 1985)

(in dollars)

Mileage	Telecom Canada	Nfld Tel	Terra Nova	Island Tel	MT&T	NBTel	Qué Tel	Bell Canada	Manitoba Tel	SaskTel	AGT	B.C. Tel	North wesTel	Can/US
10	.60	.75	.87	.44	.46	.40	.52	.52	.30	.63	.37	.77	.42	.32
15	.60	.75	.87	.53	.58	.49	.64	.87	.36	.63	.58	.83	.42	.32
20	.60	.87	1.02	.65	.70	.58	.76	.87	.42	.72	.58	.95	.42	.41
25	.79	.87	1.02	.74	.85	.68	.76	1.01	.54	.78	.79	1.07	.42	.41
30	.79	1.02	1.20	.83	.97	.76	.91	1.01	.54	.84	.79	1.22	.51	.41
35	.79	1.02	1.20	.92	1.12	.82	.91	1.19	.60	.93	.79	1.34	.51	.55
40	1.01	1.14	1.32	1.01	1.24	.89	1.06	1.19	.66	1.02	1.03	1.34	.51	.55
45	1.01	1.14	1.32	1.10	1.39	.96	1.06	1.34	.66	1.02	1.03	1.34	.69	.55
50	1.01	1.14	1.32	1.19	1.51	.96	1.21	1.34	.72	1.32	1.03	1.34	.69	.55
75	1.23	1.35	1.59	1.28	1.81	1.21	1.36	1.55	.84	1.41	1.21	1.64	1.02	.82
100	1.41	1.50	1.68	1.28	2.02	1.34	1.51	1.64	.96	1.56	1.66	1.70	1.17	.94
125	1.61	1.68	1.89	N/A	2.11	1.46	1.66	1.79	1.02	1.74	1.66	1.73	1.32	1.10
150	1.80	1.89	2.10	N/A	2.23	1.52	1.81	1.85	1.14	1.83	1.66	1.73	1.50	1.25
175	1.80	1.89	2.10	N/A	2.35	1.58	1.96	1.91	1.20	1.83	1.84	1.91	1.50	1.25
200	2.00	2.07	2.31	N/A	2.47	1.64	1.96	1.91	1.20	1.95	1.84	1.91	1.68	1.38
225	2.00	2.07	2.31	N/A	2.47	1.64	2.14	1.94	1.26	2.04	2.08	2.06	1.83	1.53
250	2.17	2.25	2.46	N/A	2.47	1.64	2.14	1.94	1.32	2.04	2.08	2.06	1.83	1.53
300	2.37	2.25	2.46	N/A	2.47	N/A	2.32	1.97	1.38	2.28	2.08	2.06	2.01	1.65
350	2.37	2.25	2.46	N/A	2.47	N/A	2.50	2.01	1.44	2.28	2.26	2.24	2.16	1.85
400	2.37	2.25	2.46	N/A	N/A	N/A	2.68	2.01	1.44	2.28	2.26	2.24	2.34	1.85
450	2.55	2.34	2.58	N/A	N/A	N/A	2.68	2.04	1.50	2.28	2.26	2.24	2.34	2.04
500	2.55	2.34	2.58	N/A	N/A	N/A	2.68	2.04	1.50	2.28	2.26	2.24	2.52	2.04
750	2.88	2.34	2.58	N/A	N/A	N/A	2.99	2.04	1.50	2.28	2.26	2.24	2.85	2.25
1 000	3.00	2.34	2.58	N/A	N/A	N/A	2.99	2.04	1.50	2.28	2.26	2.24	3.00	2.46
1 500	3.12	2.34	2.58	N/A	N/A	N/A	2.99	2.04	1.50	2.28	2.26	2.24	3.00	2.66
1 900	3.30	2.34	2.58	N/A	N/A	N/A	2.99	2.04	1.50	2.28	2.26	2.24	3.00	2.78
2 200	3.30	2.34	2.58	N/A	N/A	N/A	2.99	2.04	1.50	2.28	2.26	2.24	3.00	2.78
3 000	3.30	2.34	2.58	N/A	N/A	N/A	2.99	2.04	1.50	2.28	2.26	2.24	3.00	2.92

Note: Telecom Canada and Canada/US rates are those applicable to Bell Canada customers.

TABLE 2.11
Long-Distance, Two-Point Service Rates for Customer-Dialed Business Day, Three-Minute Duration Calls (July 1980)
(In dollars)

Mileage	Telecom Canada	B.C. Tel	AGT	SaskTel	Manitoba Tel	Bell Canada	NBTel	Island Tel	MT&T	Nfld Tel	Canada/US
10	.54	.42	.26	.33	.18	.33	.34	.33	.33	.45	.36
15	.54	.51	.40	.33	.24	.53	.40	.39	.42	.51	.36
20	.54	.63	.40	.39	.30	.53	.46	.51	.51	.57	.46
25	.71	.72	.62	.45	.42	.64	.52	.57	.63	.66	.46
30	.71	.87	.62	.45	.42	.64	.61	.69	.72	.69	.46
35	.71	.99	.62	.51	.48	.73	.67	.75	.81	.75	.58
40	.91	1.02	.80	.60	.54	.73	.73	.81	.90	.78	.58
45	.91	1.05	.80	.69	.54	.82	.79	.93	1.02	.81	.58
50	.91	1.14	.80	.69	.60	.82	.79	.99	1.11	.90	.58
75	1.11	1.32	.98	.90	.72	1.00	1.00	1.05	1.26	1.05	.70
100	1.28	1.41	1.16	.99	.84	1.09	1.12	1.05	1.47	1.14	.82
125	1.45	1.59	1.34	1.14	.90	1.15	1.24	N/A	1.71	1.29	.94
150	1.62	1.68	1.34	1.26	1.02	1.21	1.30	N/A	1.77	1.44	1.06
175	1.62	1.74	1.52	1.38	1.08	1.30	1.36	N/A	1.86	1.56	1.06
200	1.79	1.80	1.52	1.44	1.08	1.30	1.42	N/A	1.98	1.65	1.18
225	1.79	1.92	1.70	1.53	1.14	1.39	1.42	N/A	2.01	1.65	1.30
250	1.96	1.92	1.70	1.65	1.20	1.39	1.42	N/A	2.04	1.80	1.30
300	2.13	2.01	1.70	1.74	1.26	1.48	N/A	N/A	2.04	1.80	1.42
350	2.13	2.16	1.88	1.92	1.32	1.54	N/A	N/A	2.04	1.80	1.57
400	2.13	2.16	1.88	1.92	1.32	1.54	N/A	N/A	N/A	1.80	1.57
450	2.28	2.16	1.88	1.92	1.38	1.59	N/A	N/A	N/A	1.80	1.75
500	2.28	2.16	1.88	1.92	1.38	1.59	N/A	N/A	N/A	1.80	1.75
750	2.58	2.16	1.88	1.92	1.38	1.66	N/A	N/A	N/A	1.80	1.93
1 000	2.70	2.16	1.88	1.92	N/A	1.66	N/A	N/A	N/A	1.80	2.11
1 500	2.88	2.16	1.88	1.92	N/A	1.66	N/A	N/A	N/A	1.80	2.26
1 900	2.97	2.16	1.88	1.92	N/A	1.66	N/A	N/A	N/A	1.80	2.38
2 200	2.97	2.16	1.88	1.92	N/A	1.66	N/A	N/A	N/A	1.80	2.38
3 000	2.97	2.16	1.88	1.92	N/A	1.66	N/A	N/A	N/A	1.80	2.50

Note: Telecom Canada and Canada/US rates are those applicable to Bell Canada customers.

b) WATS rates

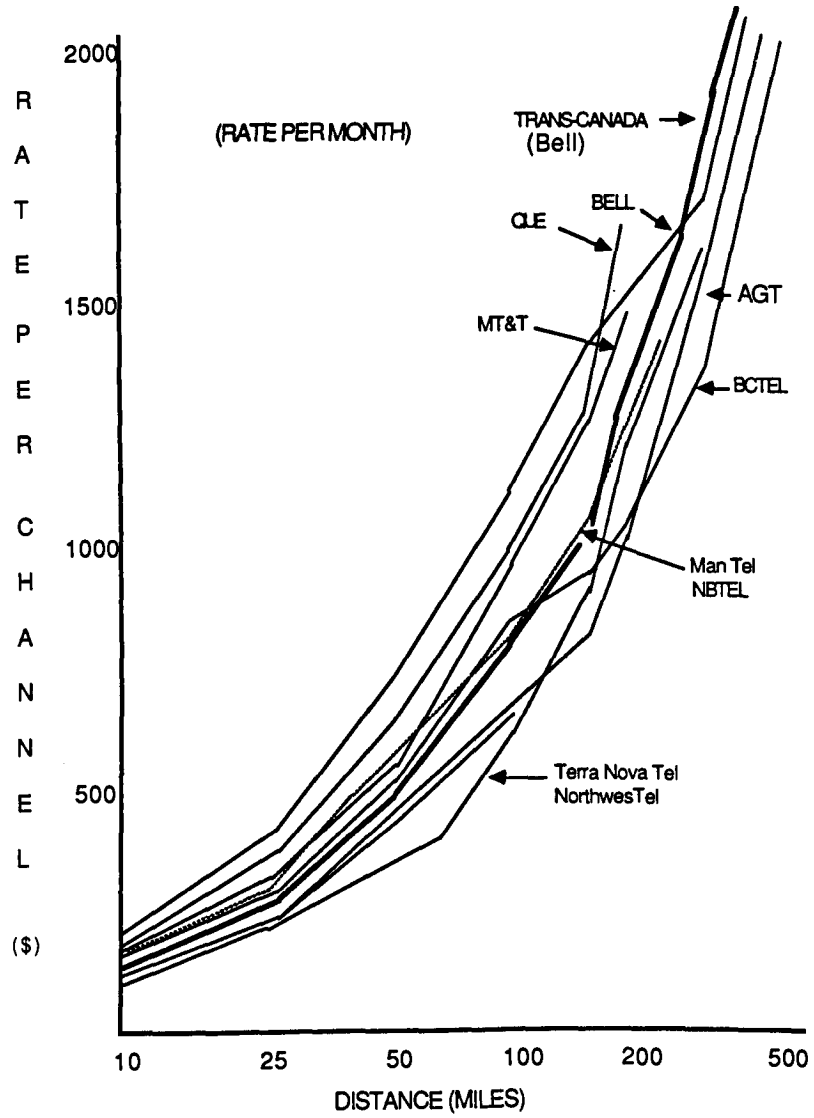
For the application of WATS rates, the country is generally divided into six zones encompassing one or more NPAs. (Some companies have additional zones within an NPA.) Subscribers to WATS lease a number of circuits to specific zones according to their traffic volumes. Subscribers may lease 120-hour service (160 hours in some jurisdictions) which provides for 120 hours of WATS calling at a flat rate and metered rates for calling beyond 120 hours. Subscribers may also choose ten-hour or five-hour service which provides for ten and five hours of calling, respectively, at a flat rate with metered rates for overtime calling. It is possible to confine these services to a specific WATS zone. A subscriber may lease a number of 120-hour circuits to handle the base traffic load and 5-hour circuits to handle peak period calling.

c) Private-line rates

Rates for individual private lines (inter-city voice grade channels or IXVGs) are based on distance only. However, in some jurisdictions there are discounts available when many circuits are leased between the same two locations. The bulk discounted private-line service is called Telpak service. For Trans-Canada service, there are three Telpak arrangements with capacities of 12, 24 and 60 circuits. Bell Canada also offers a 120-circuit Telpak. A comparison of private-line IXVG rates for the various telephone companies is shown in Figure 2.5 As can be seen, there is far less variability among the companies in private-line rates as compared to MTS.

The rates for private lines involve substantial amounts of money: a 500-mile circuit, for example, costs approximately $2 000 per month. An organization requires a high volume of calling in order to justify private-line services and, as a result, the service is economically justified only for medium-size to large organizations.

FIGURE 2.5
Inter-City Voice Grade(IXVG) Rates
(December 1985)



Source: Telephone Company General Tariffs

d) Long-distance rate relationships

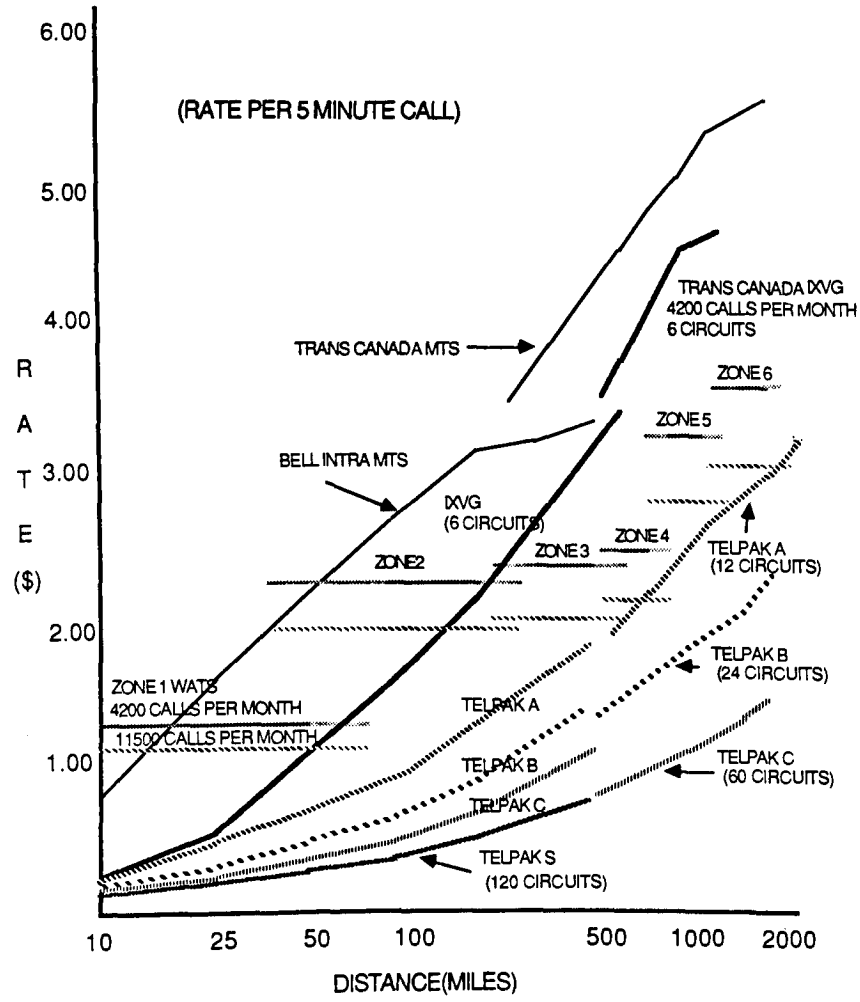
As described above, there are three long-distance services offered by the telephone companies, namely: MTS, WATS and private lines. Residential and small business subscribers will generally only be able to use MTS since their traffic volumes are not sufficiently high to realize savings using WATS and private lines. Medium and large businesses (as well as governments), however, can take advantage of the full range of long-distance services. For these subscribers, the three long-distance services are almost completely substitutable and the choice of service will depend mainly on volume. If the subscriber has a low volume of calling to a particular area or city, MTS will be the most economical. As the volume increases, WATS will become more economical and, finally, where the subscriber has large point-to-point volumes, private lines will be most economical. Finally, with the advent of intelligent PBX's, large users may combine all three long-distance services and for each call the PBX can decide which service will be most economical.

Given a specific volume of traffic, the choice of which service a customer uses for long-distance communications is critically dependent on the rate relationships among the services. Large users, especially, have the ability to shift traffic quickly among services. For example, if MTS rates drop relative to WATS and private lines, users will shift traffic to MTS from the other services.

The reaction to changes in long-distance rates varies among the different user groups. Residence and small business subscribers, because of their relatively low volume of traffic, will always use MTS and, therefore, their reaction to MTS rate changes will be either to increase or decrease traffic volume according to their demand elasticities. Larger business subscribers who have access to the full range of services will tend to react to rate changes in part by shifting traffic from one service to another.

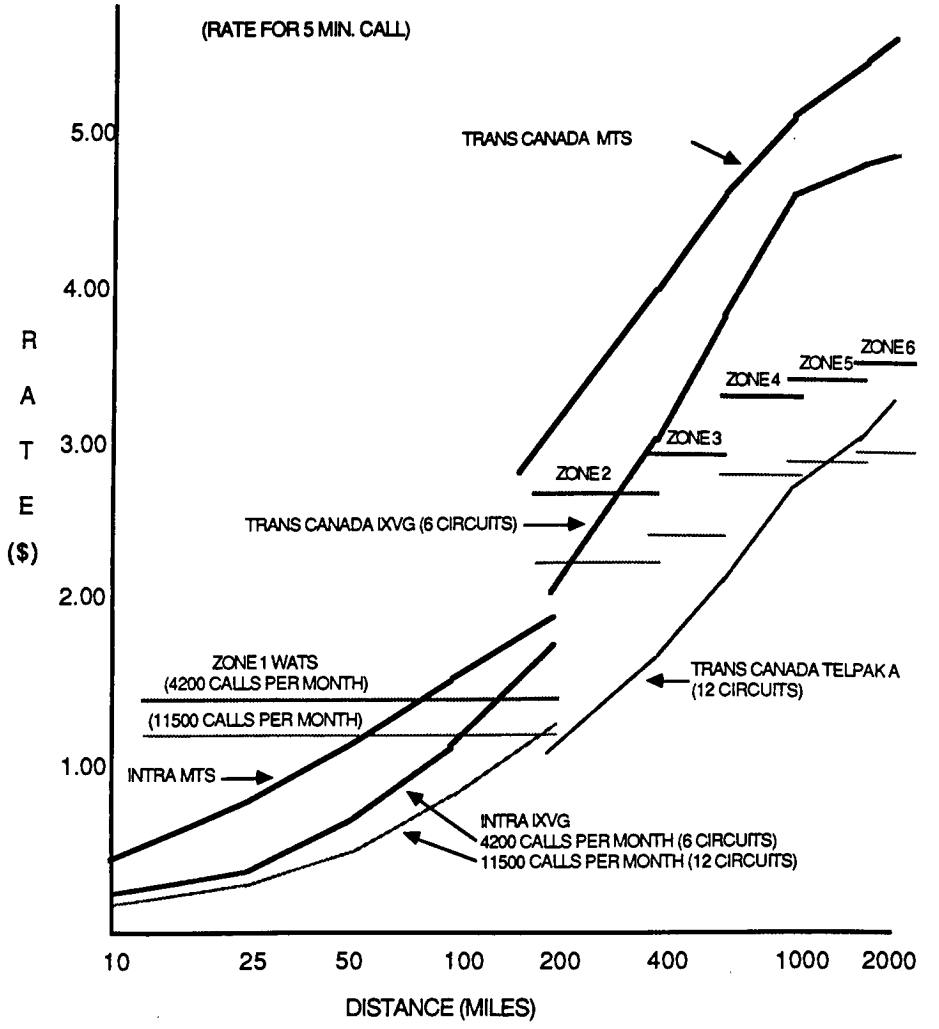
Figures 2.6 and 2.7 show the relationship among the three long-distance services in terms of the effective cost per five-minute call for Bell Canada and Manitoba Telephone System. Since the rate structures are different for each of the services, an exact comparison of the rates is not possible. Individual subscribers with well-defined calling patterns would, however, be able to derive accurate rate comparisons to enable them to choose the most economical mix of services.

FIGURE 2.6
Bell Canada: MTS, WATS and Private Line Rates
(December 1985)



Source: The company's General Tariff

FIGURE 2.7
Manitoba Telephone System: MTS, WATS and Private Line Rates (December 1985)



Source: The company's General Tariff

In order to make a general comparison of the three services, certain assumptions must first be made: While the transition distance between intra- and inter-company calling may vary greatly depending on where the originator is located, the transition distance assumed in Figures 2.6 and 2.7 is 500 miles for Bell Canada and 200 miles for Manitoba Telephone System. Similar assumptions have been made with respect to the distance range served by each WATS zone. Furthermore, the number of calls that can be carried by a group of private lines or WATS lines depends on the hourly distribution of the call volume and the desired grade of service. (The examples in Figures 2.6 and 2.7 are based on a P.05* grade of service and a traffic distribution with 17 per cent of the calls occurring in the busy hour.)

Under these assumptions, 6 and 12 private or WATS lines can handle 4 200 and 11 500 calls per month, respectively. As can be seen from Figures 2.6 and 2.7, considerable savings may be realized by subscribers with large call volumes. The effective discounts that can be realized relative to MTS may be in the area of 50 per cent using WATS and 80 per cent using private lines. These discounts, however, are only available to the largest users.

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* P.05 means that the probability of blocking is 5 per cent. In other words, for every 100 attempts to make a call, five attempts will be blocked because all of the circuits are busy.

CHAPTER 2

ENDNOTES

1. Telephone company responses to information requests (CRTC)19Feb86-1FP and (CRTC)19Feb86-25FP, Federal/Provincial Examination of Telecommunications Pricing and Universality.

2. Bell Canada, "Subscriber Line Usage Study," reported by reference in the company's response to information request Bell(CRTC)19Feb86-8FP, Federal/Provincial Examination of Telecommunications Pricing and Universality.

3. Government of Ontario, Ministry of Transportation and Communications, "Survey of Local Telephone Pricing and Usage Issues Among Customers in Ontario," Vol.1 - Residential (1985); Vol.2 - Small Business (1986).

4. Telephone company responses to information request (CRTC)19Feb86-36FP, Federal/Provincial Examination of Telecommunications Pricing and Universality.

CHAPTER 2

APPENDIX A - RATE GROUPS

APPENDIX A-1
Comparative Table of Rate Group Scales

B.C. TEL	BELL CANADA	AGT	QUÉBEC-TÉL	TÉLÉBEC
1 - 1 000	1 - 1 500	1 - 500	1 - 750	1 - 750
1 001 - 4 000	1 501 - 3 500	501 - 2 500	751 - 1 500	751 - 1 500
4 001 - 12 500	3 501 - 7 500	2 501 - 5 000	1 501 - 2 500	1 501 - 2 500
12 501 - 30 000	7 501 - 15 000	5 001 - 10 000	2 501 - 3 500	2 501 - 3 500
30 001 - 75 000	15 001 - 35 000	10 001 - 65 000	3 501 - 5 500	3 501 - 5 500
75 001 - 145 000	35 001 - 75 000	65 001 - 300 000	5 501 - 7 500	5 501 - 7 500
145 001 - 300 000	75 001 - 175 000	300 001 - 550 000	7 501 - 10 000	7 501 -10 000
300 001 - 550 000	175 001 - 500 000	550 001 - 800 000	10 001 - 12 500	10 001 -15 000
550 001 - 1 000 000	500 001 - 1 100 000	800 001 - 1 300 000	12 501 - 15 000	15 001 -25 000
1 000 001 - 1 900 000	1 100 001 - 1 700 000	1 300 001 - 1 800 000	15 001 - 20 000	25 001 -35 000
1 900 001 - 3 100 000	1 700 001 - 2 300 000	1 800 001 - 2 300 000	20 001 - 25 000	35 001 -55 000
3 100 001 - 4 300 000	2 300 001 - 2 900 000	2 300 001 - 2 800 000	25 001 - 30 000	55 001 -75 000
4 300 001 - 5 500 000	2 900 001 - 3 500 000	2 800 001 - 3 300 000	30 001 - 40 000	
5 500 001 - 6 700 000	3 500 001 - 4 100 000	More than 3 300 000	More than 40 000	
6 700 001 - 7 900 000	4 100 001 - 4 700 000			
7 900 001 - 9 100 000	4 700 001 - 5 300 000			
9 100 001 - 10 300 000	5 300 001 - 5 900 000			
10 300 001 - 11 500 000				

NBTEL	MANITOBA TELEPHONE SYSTEM	MT&T	NFLD TEL	ISLAND TEL	SASKTEL
1 - 1 000	1 - 400	1 - 1 400	1 - 4 000	1 - 1 600	1 - 3 300
1 001 - 2 400	401 - 750	1 401 - 3 000	4 001 - 14 000	1 601 - 6 000	3 301 - 90 000
2 401 - 4 700	751 - 1 350	3 001 - 6 000	14 001 - 25 000	6 001 - 16 000	More than 90 000
4 701 - 9 500	1 351 - 3 500	6 001 - 20 000	25 001 - 65 000	16 001 - 30 000	
9 501 - 13 500	3 501 - 5 500	20 001 - 60 000	65 001 - 80 000		
13 501 - 17 500	5 501 - 10 000	More than 60 000			
17 501 - 43 000	10 001 - 25 000				
43 001 - 53 000	25 001 - 40 000				
53 001 - 63 000	250 001 - 375 000				
63 001 - 73 000					

APPENDIX A-2
Determination of Rate Groups
(Extracts from Telephone Company Genral Tariffs)

QUÉBEC-TÉLÉPHONE

Rate Group	Access Line Count
1	1 - 750
2	751 - 1 500
3	1 501 - 2 500
4	2 501 - 3 500
5	3 501 - 5 500
6	5 501 - 7 500
7	7 501 - 10 000
8	10 001 - 12 500
9	12 501 - 15 000
10	15 001 - 20 000
11	20 001 - 25 000
12	25 001 - 30 000
13	30 001 - 40 000
14	40 001 and more

TÉLÉBEC

Rate Group	Access Line Count
1	1 - 750
2	751 - 1 500
3	1 501 - 2 500
4	2 501 - 3 500
5	3 501 - 5 500
6	5 501 - 7 500
7	7 501 - 10 000
8	10 001 - 15 000
9	15 001 - 25 000
10	25 001 - 35 000
11	35 001 - 55 000
12	55 001 - 75 000
CUQ	(Special) Undetermined

BELL CANADA

Rate Group	Weighted number of telephone numbers for exchange rate grouping
3	1 - 1 500
3 A	1 - 1 500
4	1 501 - 3 500
5	3 501 - 7 500
6	7 501 - 15 000
7	15 001 - 35 000
8	35 001 - 75 000
9	75 001 - 175 000
10	175 001 - 500 000
11	500 001 - 1 100 000
12	1 100 001 - 1 700 000
13	1 700 001 - 2 300 000
14	2 300 001 - 2 900 000
15	2 900 001 - 3 500 000
16	3 500 001 - 4 100 000
17	4 100 001 - 4 700 000
18	4 700 001 - 5 300 000
19	5 300 001 - 5 900 000

B.C. TEL

Rate Group	Access Line Count
1	Exchanges without 24 hour service
2	1 - 1,000
3	1 001 - 4 000
4	4 001 - 12 500
5	12 501 - 30,000
6	30 001 - 75,000
7	75 001 - 145,000
8	145 001 - 300 000
9	300 001 - 550 000
10	550 001 - 1 000 000
11	1 000 001 - 1 900 000
12	1 900 001 - 3 100 000
13	3 100 001 - 4 300 000
14	4 300 001 - 5 500 000
15	5 500 001 - 6 700 000
16	6 700 001 - 7 900 000
17	7 900 001 - 9 100 000
18	9 100 001 - 10 300 000
19	10 300 001 - 11 500 000

AGT

Rate Group	Total main station count for exchange rate grouping
1	0 - 500
2	501 - 2,500
3	2 501 - 5,000
4	5 001 - 10 000
5	10 001 - 65 000
6	65 001 - 300 000
7	300 001 - 550 000
8	550 001 - 800 000
9	800 001 - 1 300 000
10	1 300 001 - 1 800 000
11	1 800 001 - 2 300 000
12	2 300 001 - 2 800 000
13	2 800 001 - 3 300 000
14	Over 3,300,001

MANITOBA TELEPHONE SYSTEM

Rate Group	Telephone count in an exchange or EAS area
1	1 - 400
2	401 - 750
3	751 - 1 350
4	1 351 - 3 500
5	3 501 - 5 500
6	5 501 - 10 000
7	10 001 - 25 000
8	25 001 - 40 000
9	250 001 - 375 000

APPENDIX A-2 (Continued)

NBTEL

Rate Group	Telephones in Exchange or Local Service Area
1	0 - 1 000
2	1 001 - 2 400
3	2 401 - 4 700
4	4 701 - 9 500
5	9 501 - 13 500
6	13 501 - 17 500
7	17 501 - 43 000
8	43 001 - 53 000
9	53 001 - 63 000
10	63 001 - 73 000

MT&T

Rate Group	Total Telephone Numbers
1	1 - 1 400
2	1 401 - 3 000
3	3 001 - 6 000
4	6 001 - 20 000
5	20 001 - 60 000
6	Over 60 000

ISLAND TEL

Rate Group	Total Telephone Numbers
1	1 - 1 600
2	1 601 - 6 000
3	6 001 - 16 000
4	16 001 - 30 000

NFLD TEL

Rate Group	Total Telephone Numbers
1	1 - 4 000
2	4 001 - 14 000
3	14 001 - 25 000
4	25 001 - 65 000
5	65 001 - 80 000

SASKTEL

Rate Group	Total Main Telephones
1	1 - 3 300
2	3 301 - 90 000
3	Over 90 000

CHAPTER 2

APPENDIX B - Comparison of Local Service Rates

Explanatory Notes:

1 - Rates include a regular rotary-dial telephone.

2 - 1R: individual residence service

3 - 2R: two-party residence service

4 - 1A: individual business service

5 - 2A: two-party business service

6 - N/D: service not available

7 - N/A: the company has no rates applicable to this service

APPENDIX B-1 -- EXCHANGE A

EXCHANGE: A (2 670 access lines)

RATES WITH EXTENDED AREA SERVICE

	1 R	2 R	1 A	2 A	Rate Group
NFLD Tel.	8.75	6.75	19.00	12.45	1
Island Tel.	10.25	9.75	21.90	20.40	2
M.T. & T.	11.40	10.10	21.15	19.85	2
N.B. Tel.	10.25	9.40	22.05	20.90	3
Québec-Téléphone	10.10	9.10	22.00	18.40	4 D
Télébec Ltée	11.05	8.55	23.85	18.95	4 E
Bell Canada	7.65	5.15	16.70	12.70	4
Manitoba Tel	5.25	4.90	10.30	N.D.	4
Sask. Tel.	5.70	N.D.	10.95	N.D.	1
A.G.T.	7.99	N.D.	18.22	N.D.	4
B.C. Tel.	9.35	5.70	21.00	N.D.	4

Basic service parameters

		Access lines	Distance (miles)
Exchange: A		520	-
Extended area service with 2 exchanges:	X	1 120	4.6
	Y	1 030	8.2
	TOTAL	2 670	

EXCHANGE: A (520 access lines)

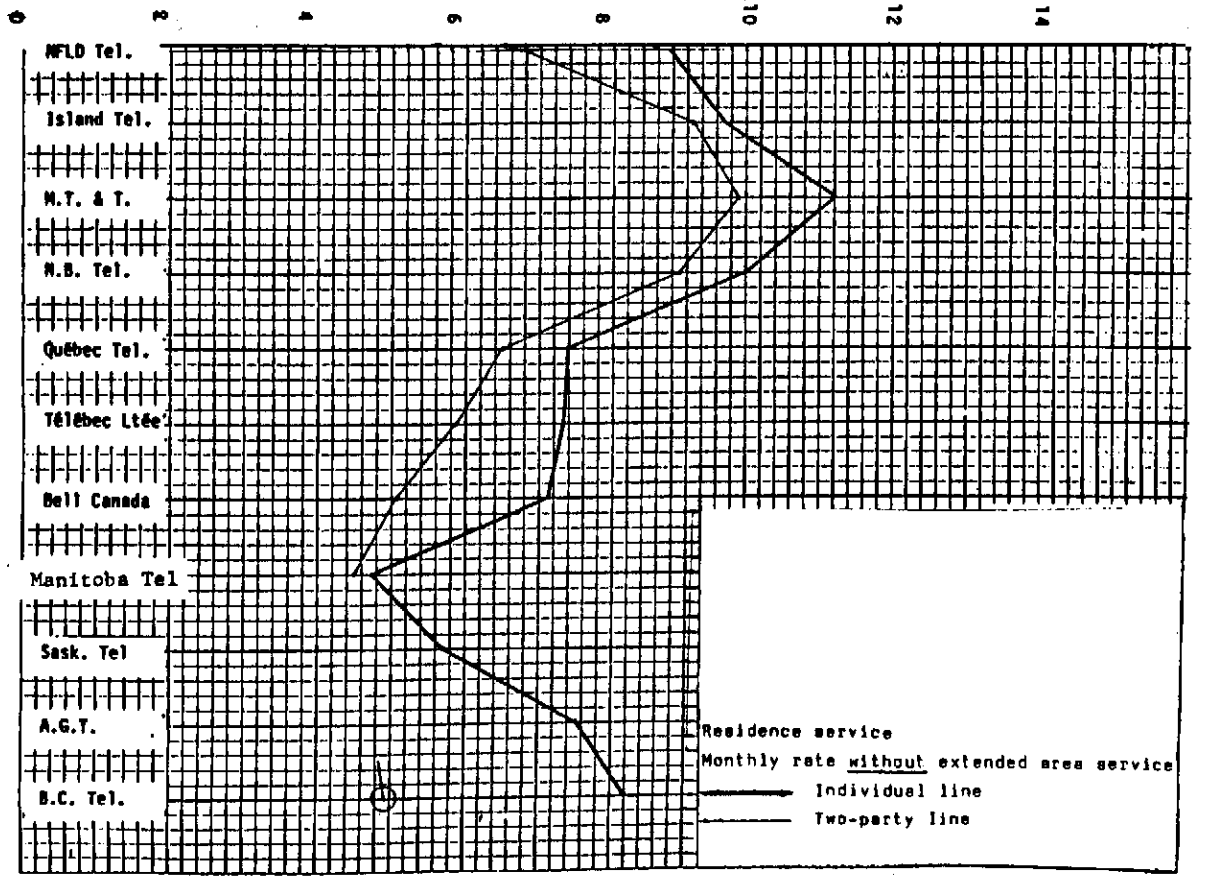
RATES WITHOUT EXTENDED AREA SERVICE

	1 R	2 R	1 A	2 A	Rate Group
NFLD Tel.	8.75	6.75	19.00	12.45	1
Island Tel.	9.50	9.05	18.25	17.20	1
M.T. & T.	11.00	9.70	17.00	15.70	1
N.B. Tel.	9.80	8.90	18.50	17.40	1
Québec-Téléphone	7.40	6.50	13.80	10.80	1
Télébec Ltée	7.35	5.85	14.70	11.90	1
Bell Canada	7.15	4.85	14.70	11.15	3
Manitoba Tel	4.75	4.50	8.65	N.D.	2
Sask. Tel.	5.70	N.D.	10.95	N.D.	1
A.G.T.	7.56	N.D.	14.13	N.D.	2
B.C. Tel.	8.20	4.95	16.10	N.D.	2

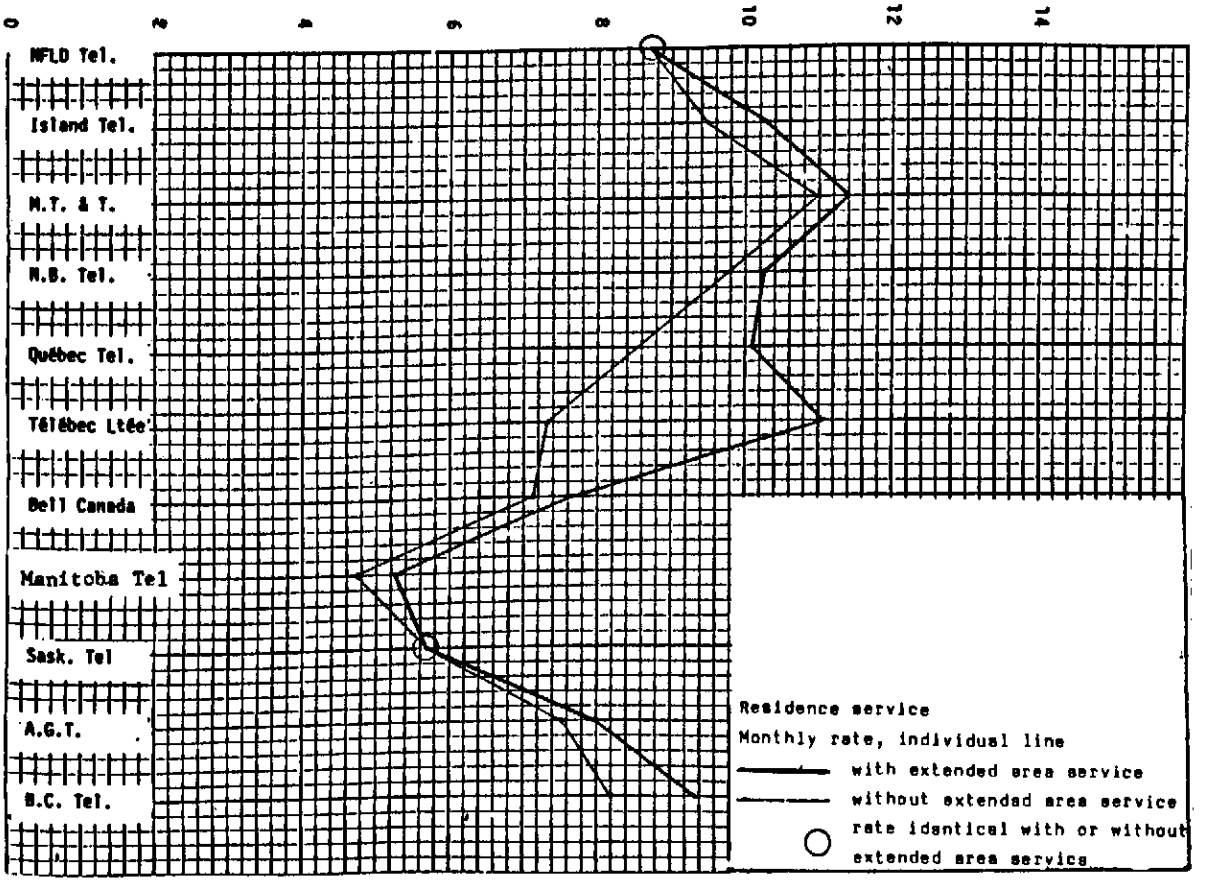
Basic service parameters

	Access lines	Distance (miles)
Exchange: A	520	
Extended area service: none		

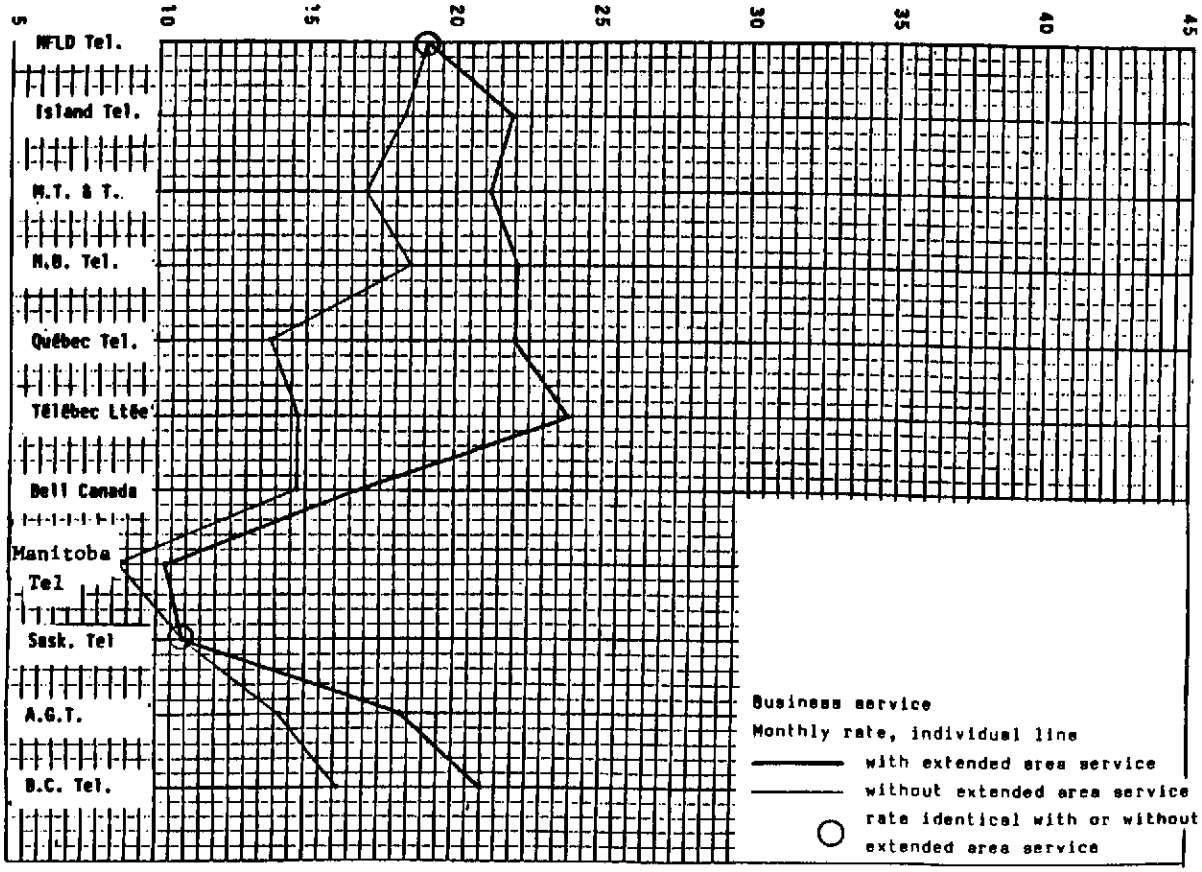
RESIDENCE SERVICE MONTHLY RATE (in dollars)



RESIDENCE SERVICE MONTHLY RATE (in dollars)



BUSINESS SERVICE MONTHLY RATE (in dollars)



APPENDIX B-2 -- EXCHANGE B

EXCHANGE: B (7 080 access lines)

RATES WITH EXTENDED AREA SERVICE

	1 R	2 R	1 A	2 A	Rate Group
NFLD Tel.	9.90	7.90	26.40	15.40	2
Island Tel.	11.90	11.40	32.20	30.05	3
M.T. & T.	12.20	10.90	27.55	N.D.	4
N.B. Tel.	10.55	9.70	23.45	22.30	4
Québec-Téléphone	11.20	10.20	29.65	25.55	6 G
Télébec Ltée	12.75	10.00	29.30	23.00	6 G
Bell Canada	8.65	5.50	21.35	15.70	6
Manitoba Tel	5.95	5.55	12.60	N.D.	6
Sask. Tel.	7.10	N.D.	15.40	N.D.	2
A.G.T.	8.37	N.D.	20.27	N.D.	5
B.C. Tel.	10.50	6.55	26.20	N.D.	6

Basic service parameters

		Access lines	Distance (miles)
Exchange: B		4 080	-
Extended area service with 3 exchanges:	X	1 750	11.5
	Y	710	12.4
	Z	540	17.5
	TOTAL	7 080	

EXCHANGE: B (4 080 access lines)

RATES WITHOUT EXTENDED AREA SERVICE

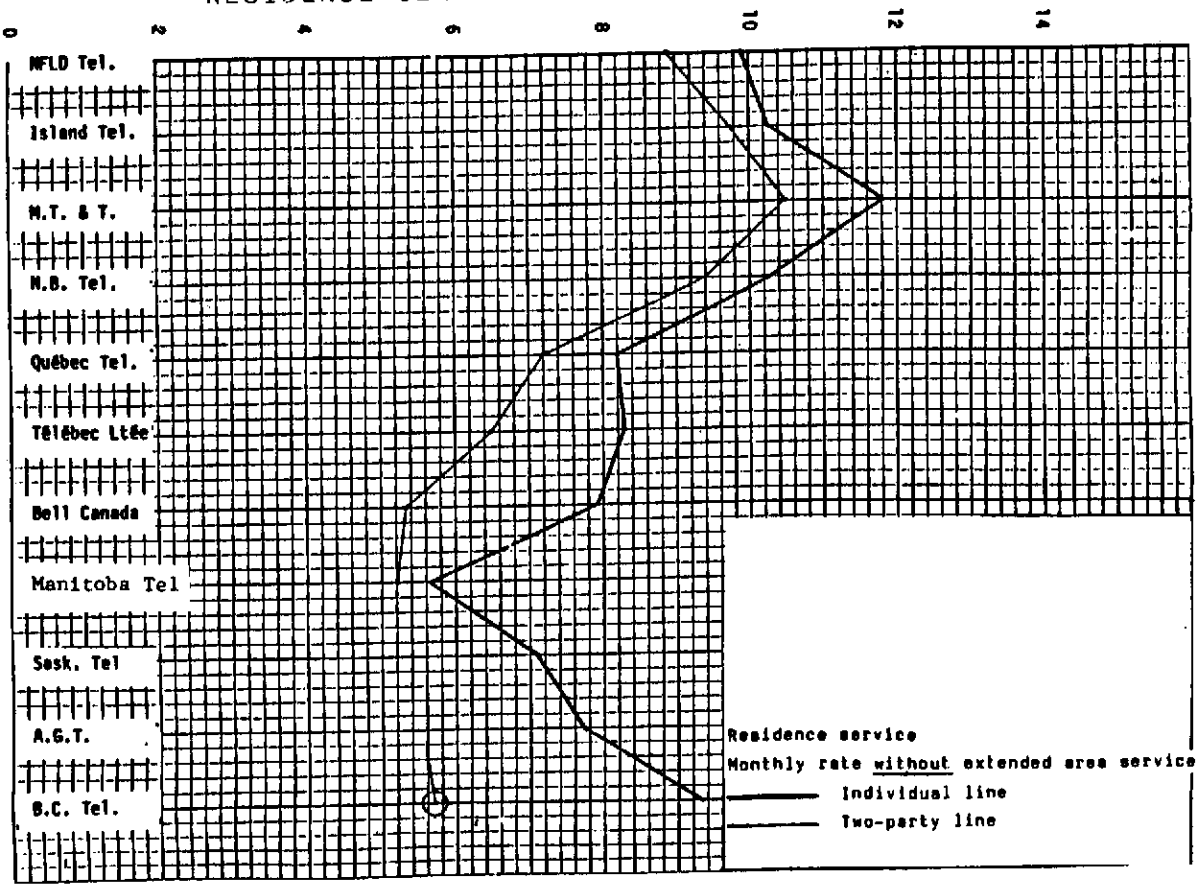
	1 R	2 R	1 A	2 A	Rate Group
NFLD Tel.	9.90	7.90	26.40	15.40	2
Island Tel.	10.25	9.75	21.90	20.40	2
M.T. & T.	11.80	10.50	24.15	N.D.	3
N.B. Tel.	10.25	9.40	22.05	20.90	3
Québec-Téléphone	8.20	7.20	18.80	14.95	5
Télébec Ltée	8.30	6.50	18.50	14.60	5
Bell Canada	7.95	5.35	18.80	14.10	5
Manitoba Tel	5.65	5.20	11.25	N.D.	5
Sask. Tel.	7.10	N.D.	15.40	N.D.	2
A.G.T.	7.75	N.D.	16.18	N.D.	3
B.C. Tel.	9.35	5.70	21.00	N.D.	4

Basic service parameters

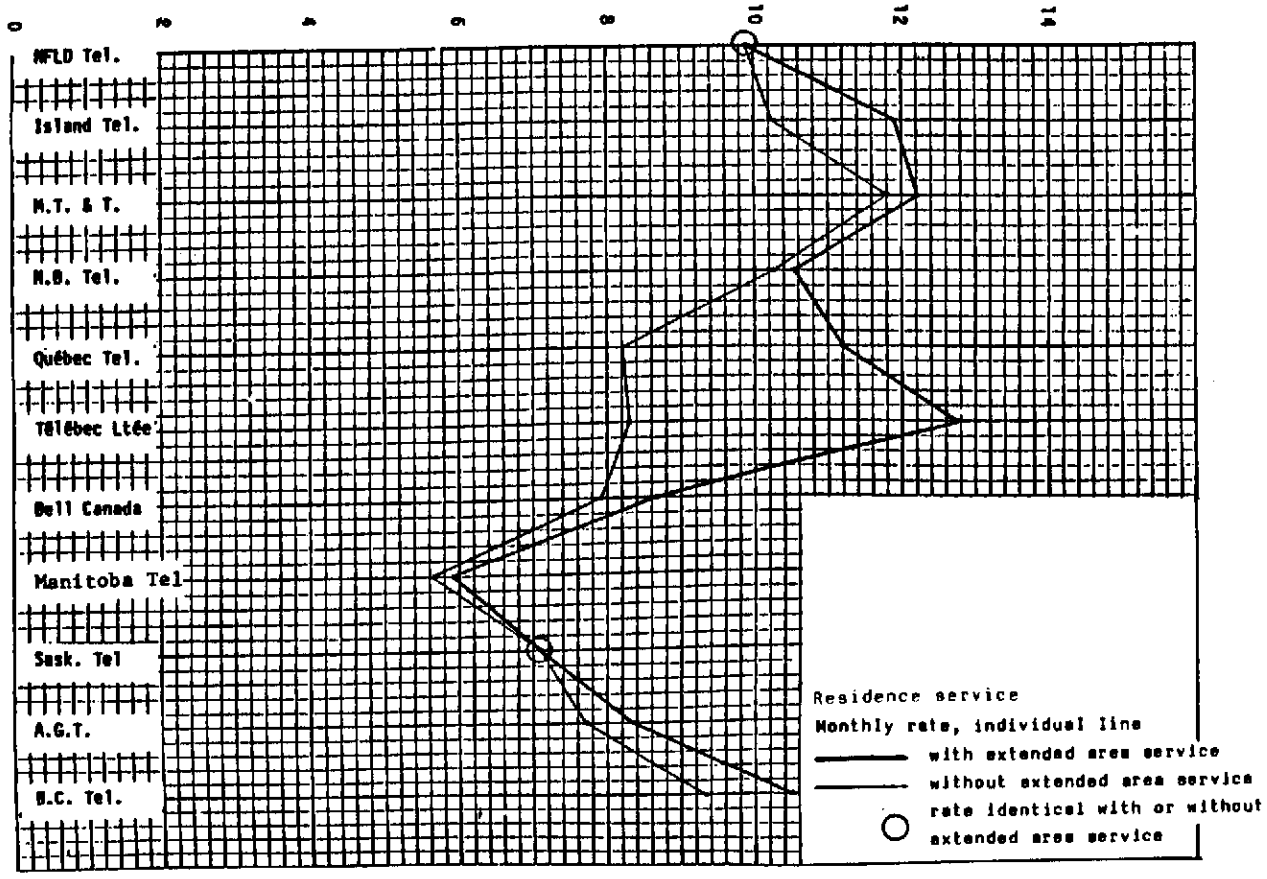
	Access lines	Distance (miles)
Exchange: B	4 080	-
Extended area service: none		

APPENDIX B-2 (Continued)

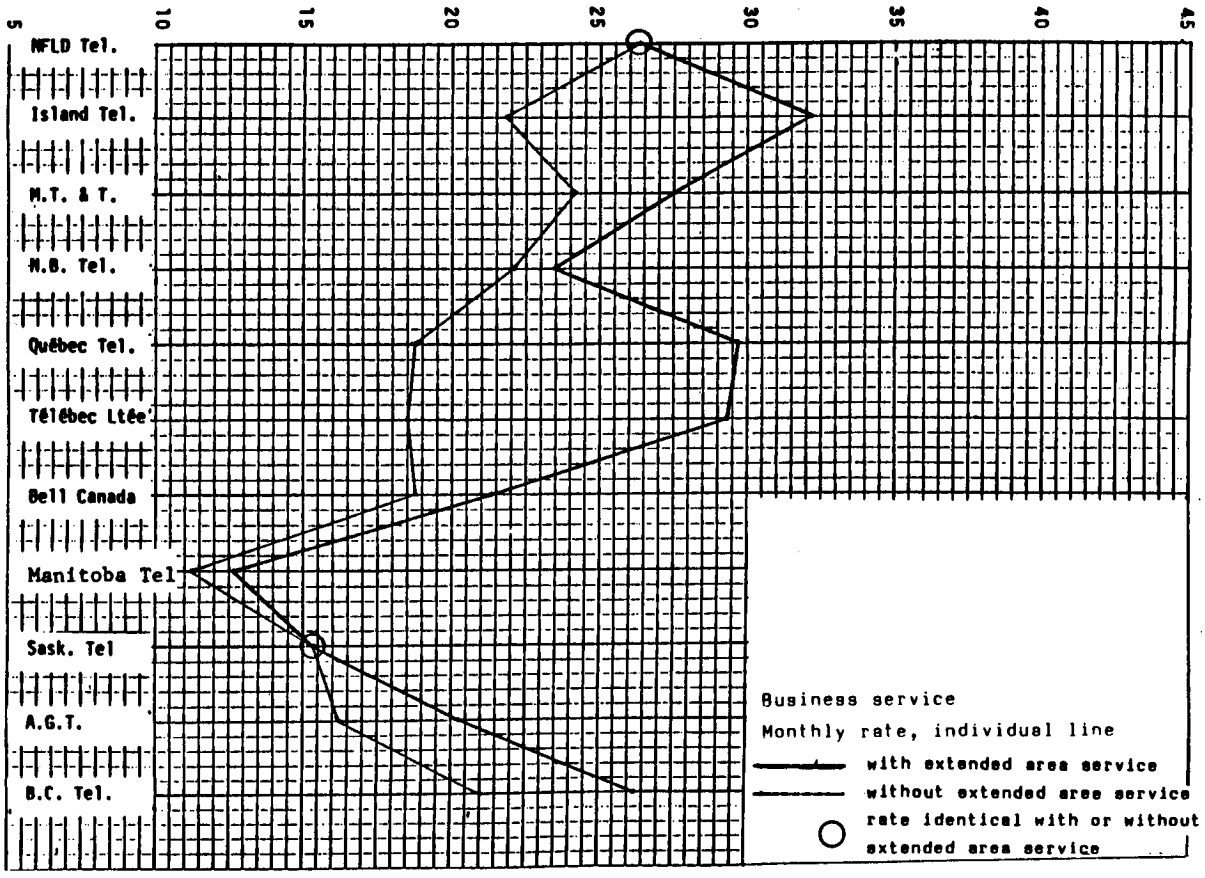
RESIDENCE SERVICE MONTHLY RATE (in dollars)



RESIDENCE SERVICE MONTHLY RATE (in dollars)



BUSINESS SERVICE MONTHLY RATE (in dollars)



APPENDIX B-3 -- EXCHANGE C

EXCHANGE: C (16 760 access lines)

RATES WITH EXTENDED AREA SERVICE

	1 R	2 R	1 A	2 A	Rate Group
NFLD Tel.	10.85	8.85	31.80	19.05	3
Island Tel.	12.60	12.10	38.30	36.00	4
M.T. & T.	12.20	10.90	27.55	N.D.	4
N.B. Tel.	11.10	10.25	27.45	24.90	6
Québec-Téléphone	12.25	11.15	36.55	31.60	10 G
Télébec Ltée	12.20	9.70	31.75	23.60	9 D
Bell Canada	8.95	5.60	24.35	N.D.	7
Manitoba Tel	6.30	5.85	14.15	N.D.	7
Sask. Tel.	7.10	N.D.	15.40	N.D.	2
A.G.T.	8.37	N.D.	20.27	N.D.	5
B.C. Tel.	10.50	6.55	26.20	N.D.	6

Basic service parameters

		Access lines	Distance (miles)
Exchange: C			
Extended area service with		14 210	-
5 exchanges:	V	1 110	4.6
	W	210	9.3
	X	380	10.8
	Y	500	11.4
	Z	350	24.3
	TOTAL	16 760	

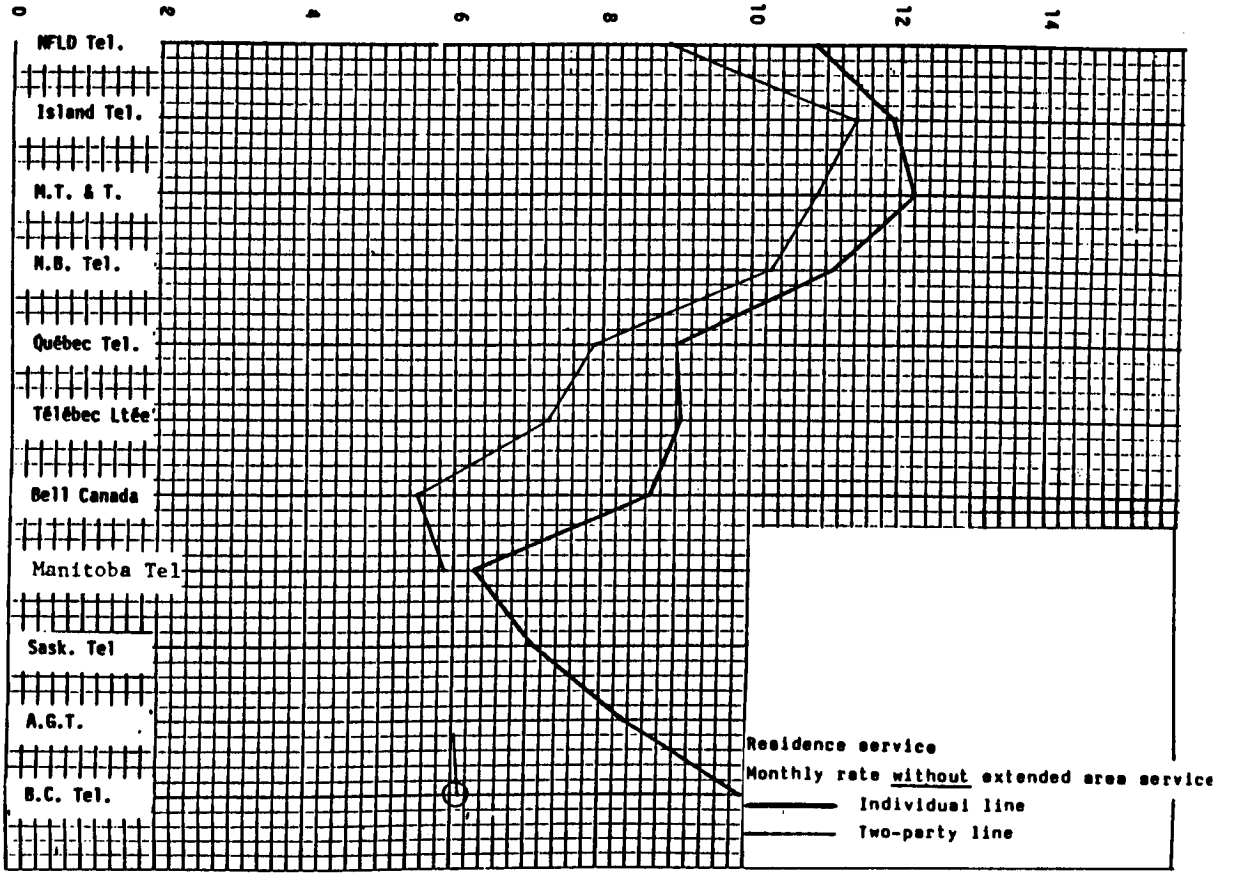
EXCHANGE: C (14 210 access lines)

RATES WITHOUT EXTENDED AREA SERVICE

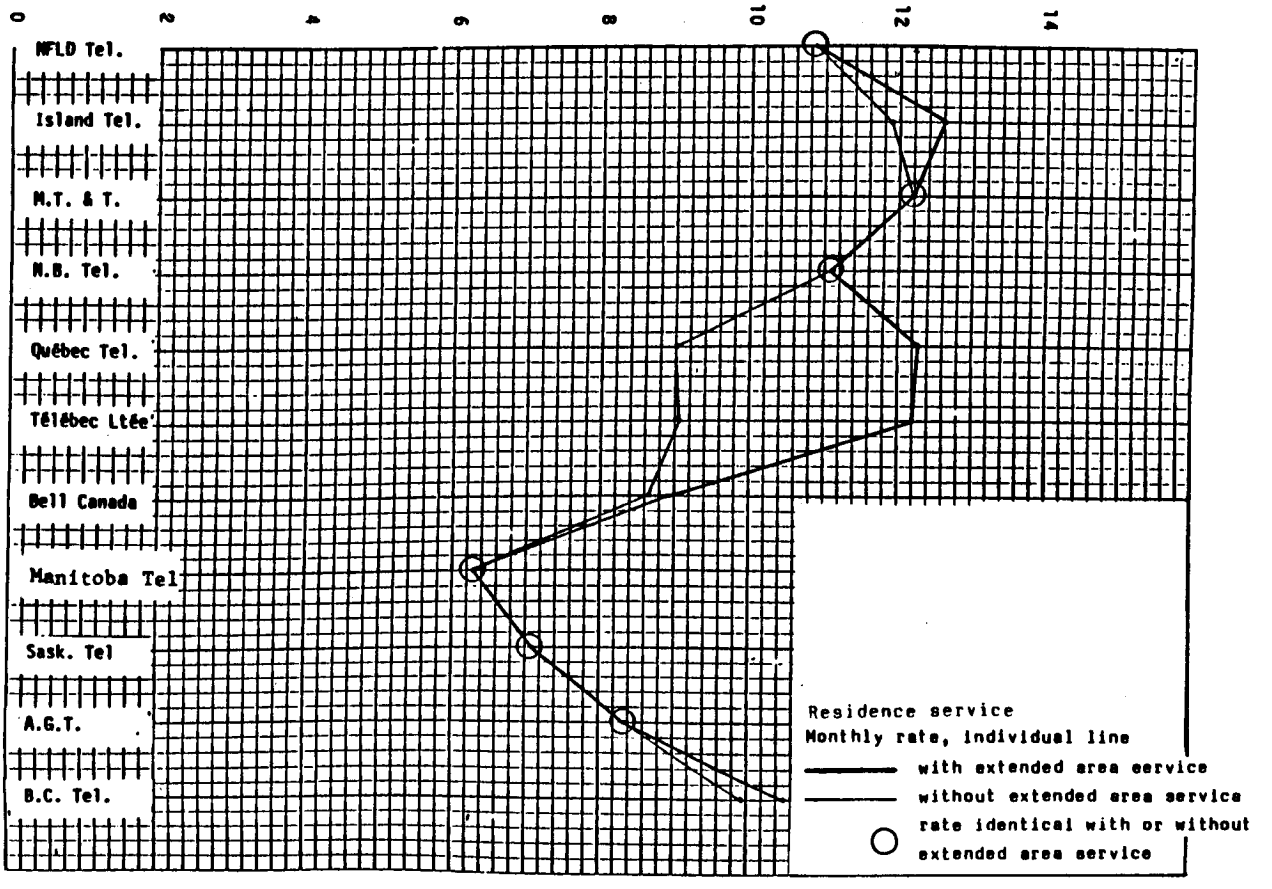
	1 R	2 R	1 A	2 A	Rate Group
NFLD Tel.	10.85	8.85	31.80	19.05	3
Island Tel.	11.90	11.40	32.20	30.05	3
M.T. & T.	12.20	10.90	27.55	N.D.	4
N.B. Tel.	11.10	10.25	27.45	24.90	6
Québec-Téléphone	9.00	7.90	24.05	19.30	9
Télébec Ltée	9.05	7.25	22.50	17.15	8
Bell Canada	8.65	5.50	21.35	15.70	6
Manitoba Tel	6.30	5.85	14.15	N.D.	7
Sask. Tel.	7.10	N.D.	15.40	N.D.	2
A.G.T.	8.37	N.D.	20.27	N.D.	5
B.C. Tel.	9.95	6.10	23.55	N.D.	5

Basic service parameters	Access lines	Distance (miles)
Exchange: C	14 210	-
Extended area service: none		

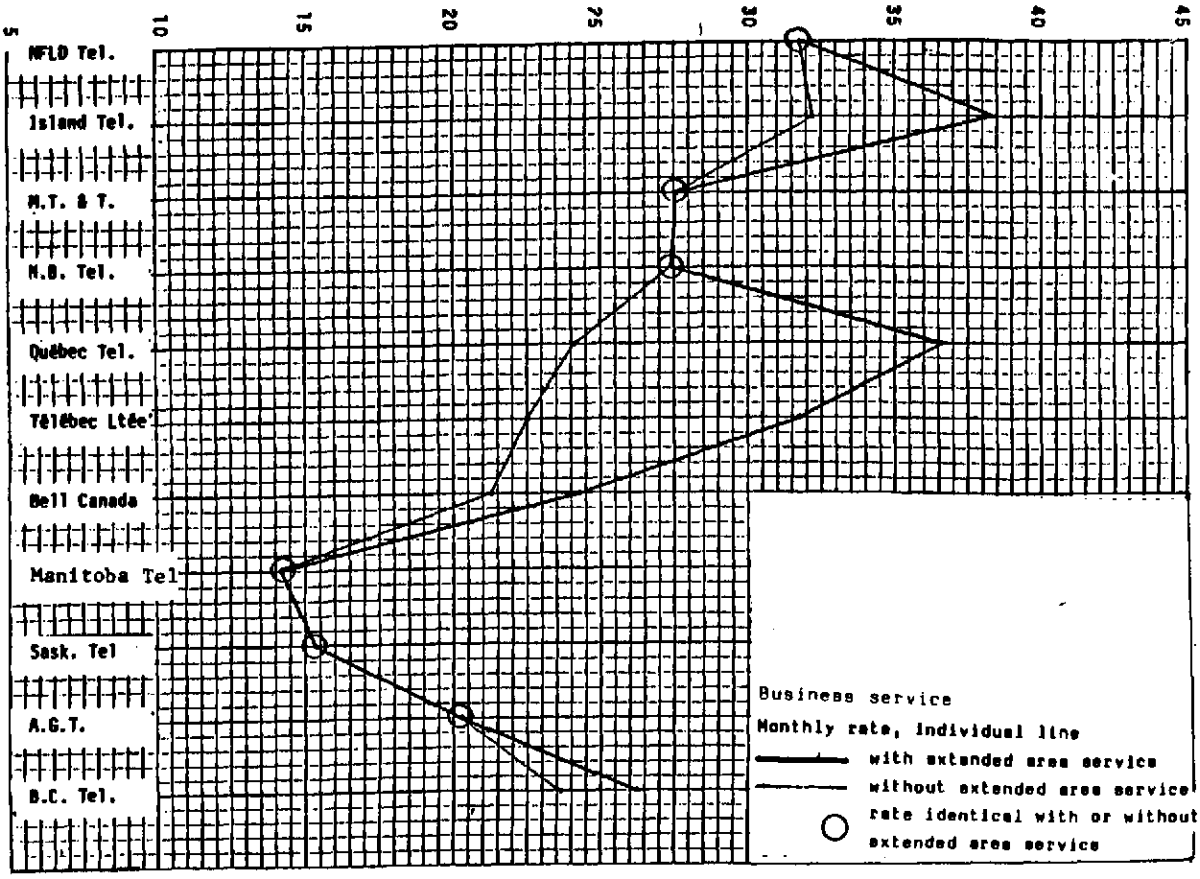
RESIDENCE SERVICE MONTHLY RATE (in dollars)



RESIDENCE SERVICE MONTHLY RATE (in dollars)



BUSINESS SERVICE MONTHLY RATE (in dollars)



APPENDIX B-4 -- EXCHANGE D

EXCHANGE: D (27 570 access lines)

RATES WITH EXTENDED AREA SERVICE

	1 R	2 R	1 A	2 A	Rate Group
NFLD Tel.	11.90	9.90	36.80	22.50	4
Island Tel.	12.60	12.10	38.30	36.00	4
N.T. & T.	12.65	11.35	32.50	N.D.	5
N.B. Tel.	11.45	10.55	29.80	27.15	7
Québec-Téléphone	12.80	11.65	38.85	33.60	12 6
Télébec Ltée	13.20	10.55	35.75	26.10	10 E
Bell Canada	8.95	5.60	24.35	N.D.	7
Manitoba Tel	6.75	6.15	16.40	N.D.	8
Sask. Tel.	7.10	N.D.	15.40	N.D.	2
A.G.T.	8.37	N.D.	20.27	N.D.	5
B.C. Tel.	11.10	6,90	28.75	N.D.	7

Basic service parameters

		Access lines	Distance (miles)
Exchange: D		21 300	-
Extended area service with 5 exchanges:	V	1 270	6.0
	W	1 460	9.0
	X	1 550	10.8
	Y	950	16,9
	Z	1 040	18,6
	TOTAL	27 570	

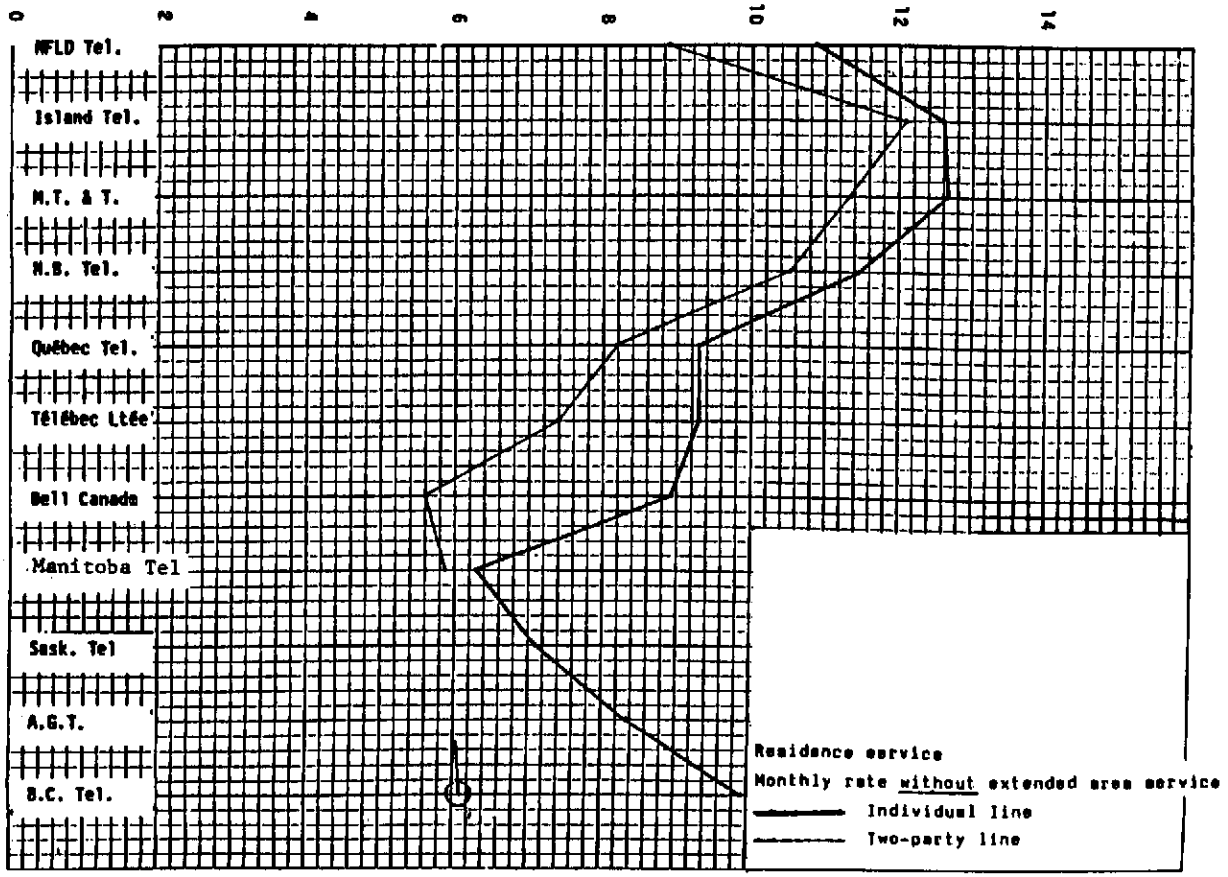
EXCHANGE: D (21 300 access lines)

RATES WITHOUT EXTENDED AREA SERVICE

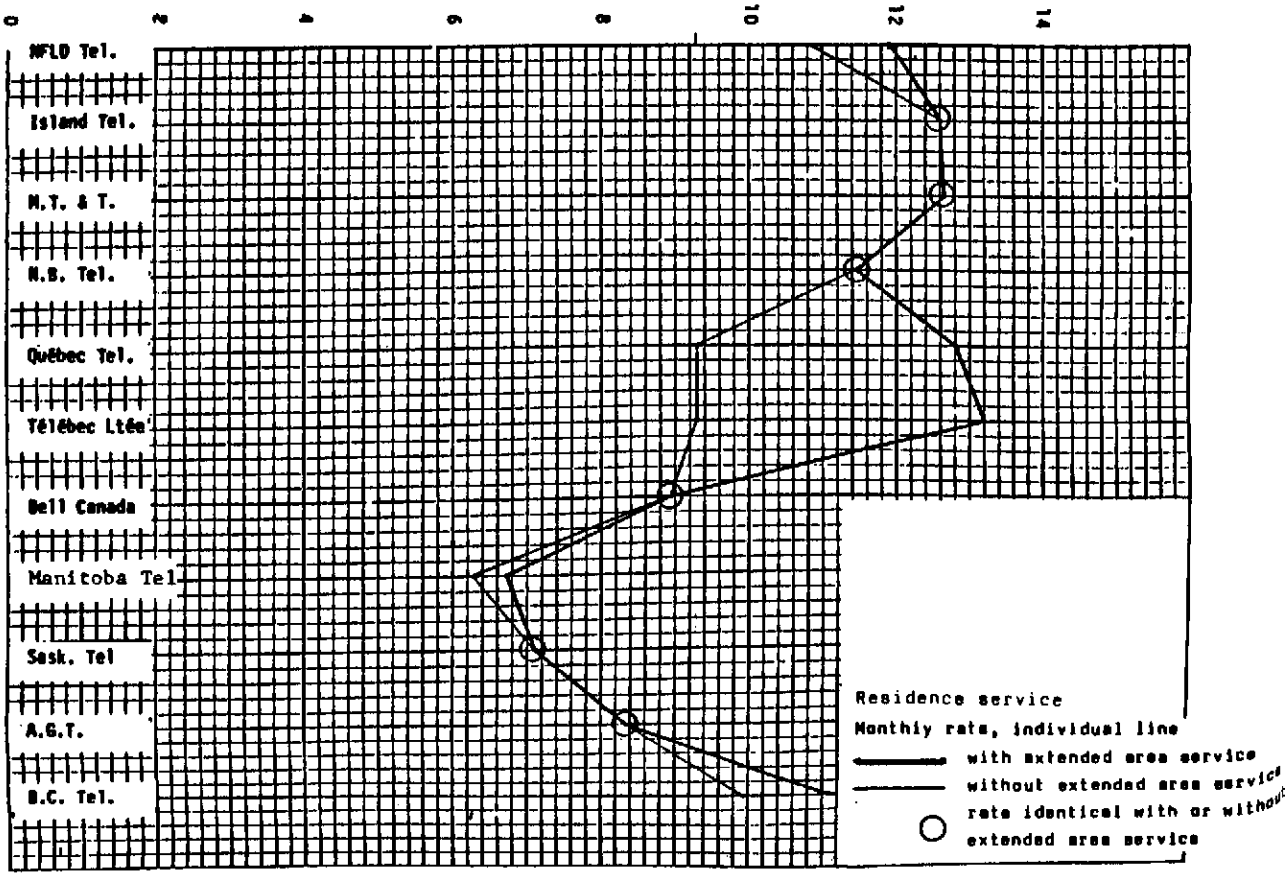
	1 R	2 R	1 A	2 A	Rate Group
NFLD Tel.	10.85	8,85	31.80	19.05	3
Island Tel.	12.60	12.10	38.30	36,00	4
N.T. & T.	12.65	11.35	32.50	N.D.	5
N.B. Tel.	11.45	10.55	29.80	27.15	7
Québec-Téléphone	9.30	8.20	26.00	20,90	11
Télébec Ltée	9.30	7.40	24.25	18,00	9
Bell Canada	8.95	5.60	24.35	N.D.	7
Manitoba Tel	6.30	5.85	14,15	N.D.	7
Sask. Tel.	7.10	N.D.	15.40	N.D.	2
A.G.T.	8.37	N.D.	20.27	N.D.	5
B.C. Tel.	9.95	6,10	23.55	N.D.	5

Basic service parameters

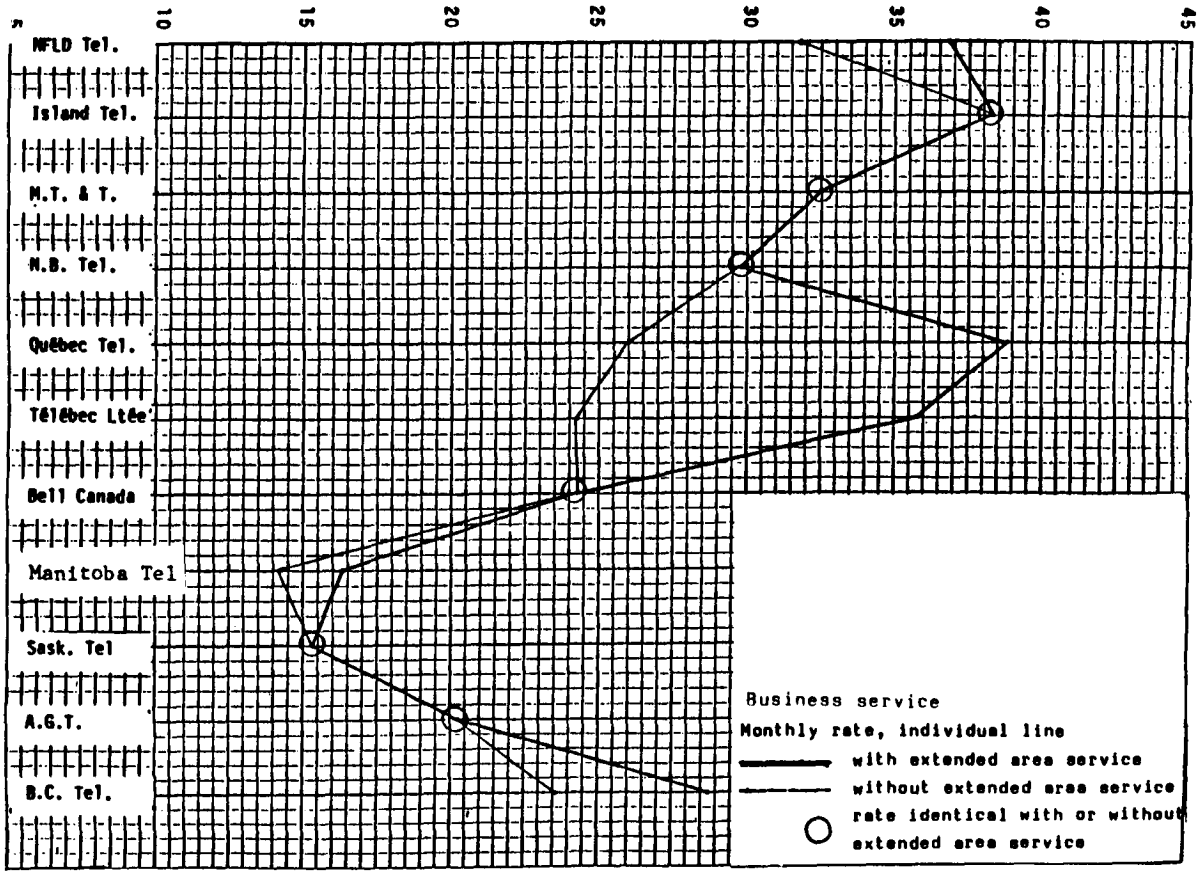
	Access lines	Distance (miles)
Exchange: D	21 300	-
Extended area service: none		



RESIDENCE SERVICE MONTHLY RATE (in dollars)



BUSINESS SERVICE MONTHLY RATE (in dollars)



APPENDIX B-5 -- EXCHANGE E

EXCHANGE: E (58 980 access lines)

RATES WITH EXTENDED AREA SERVICE

	1 R	2 R	1 A	2 A	Rate Group
NFLD Tel.	11.90	9.90	36.80	22.50	4
Island Tel.	N/A	N/A	N/A	N/A	N/A
M.T. & T.	12.65	11.35	32.50	N.D.	5
N.B. Tel.	12.05	11.20	35.45	32.90	9
Québec-Téléphone	13.80	12.55	44.10	38.05	14 G
Télébec Ltée	13.45	10.85	39.95	27.50	12 D
Bell Canada	9.55	6.20	27.90	N.D.	8
Manitoba Tel	N/A	N/A	N/A	N/A	N/A
Sask. Tel.	7.10	N.D.	15.40	N.D.	2
A.G.T.	8.71	N.D.	22.27	N.D.	6
B.C. Tel.	11.10	6.90	28.75	N.D.	7

Basic service parameters

		Access lines	Distance (miles)
Exchange: E		51 830	-
Extended area service with 6 exchanges:	U	1 010	5.9
	V	3 120	9.5
	W	1 180	12.9
	X	1 210	14.7
	Y	300	16.9
	Z	330	17.1
	TOTAL	58 980	

EXCHANGE: E (51 830 access lines)

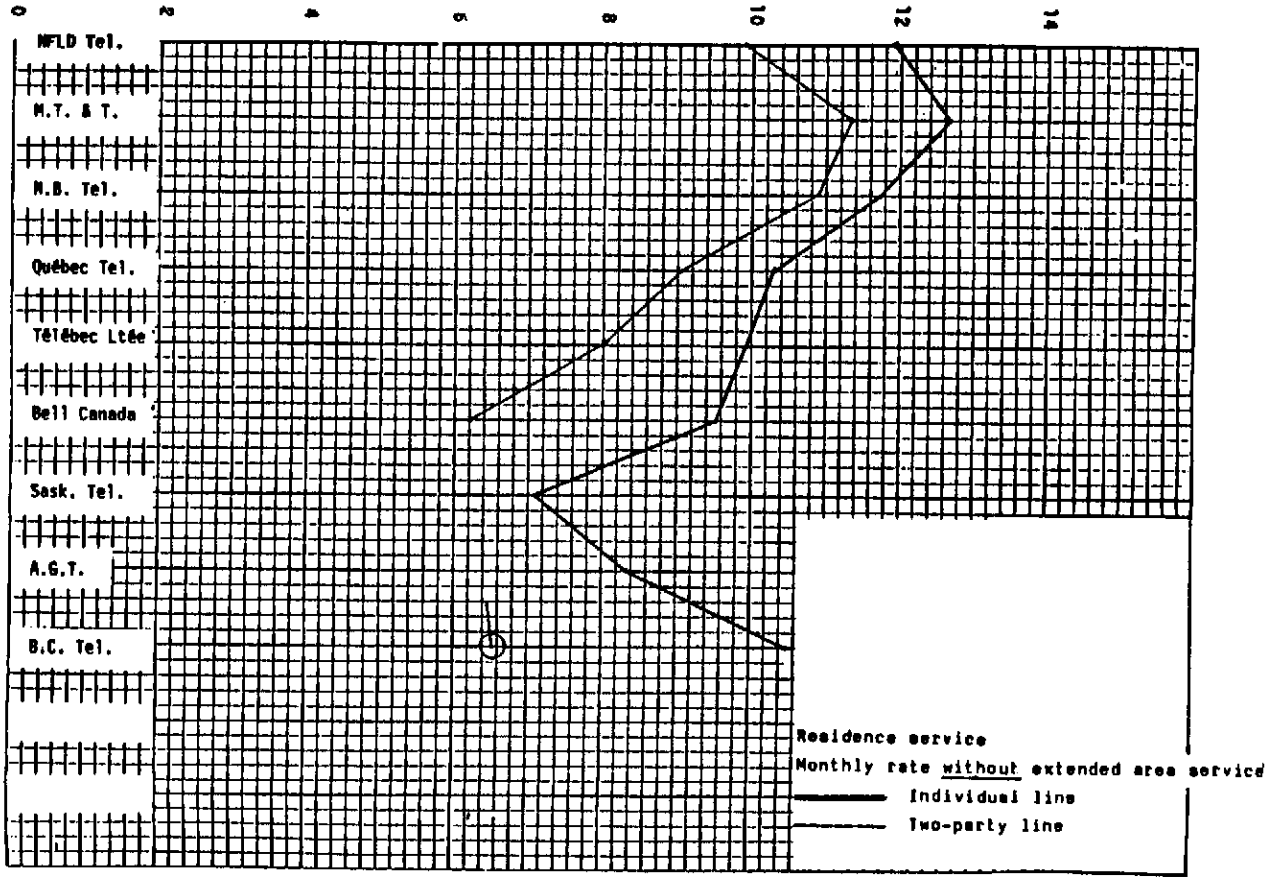
RATES WITHOUT EXTENDED AREA SERVICE

	1 R	2 R	1 A	2 A	Rate Group
NFLD Tel.	11.90	9.90	36.80	22.50	4
Island Tel.	N/A	N/A	N/A	N/A	N/A
M.T. & T.	12.65	11.35	32.50	N.D.	5
N.B. Tel.	11.75	10.90	32.60	30.05	8
Québec-Téléphone	10.30	9.05	31.60	25.55	14
Télébec Ltée	9.95	8.00	28.20	19.95	11
Bell Canada	9.55	6.20	27.90	N.D.	8
Manitoba Tel	N/A	N/A	N/A	N/A	N/A
Sask. Tel.	7.10	N.D.	15.40	N.D.	2
A.G.T.	8.37	N.D.	20.27	N.D.	5
B.C. Tel.	10.50	6.55	26.20	N.D.	6

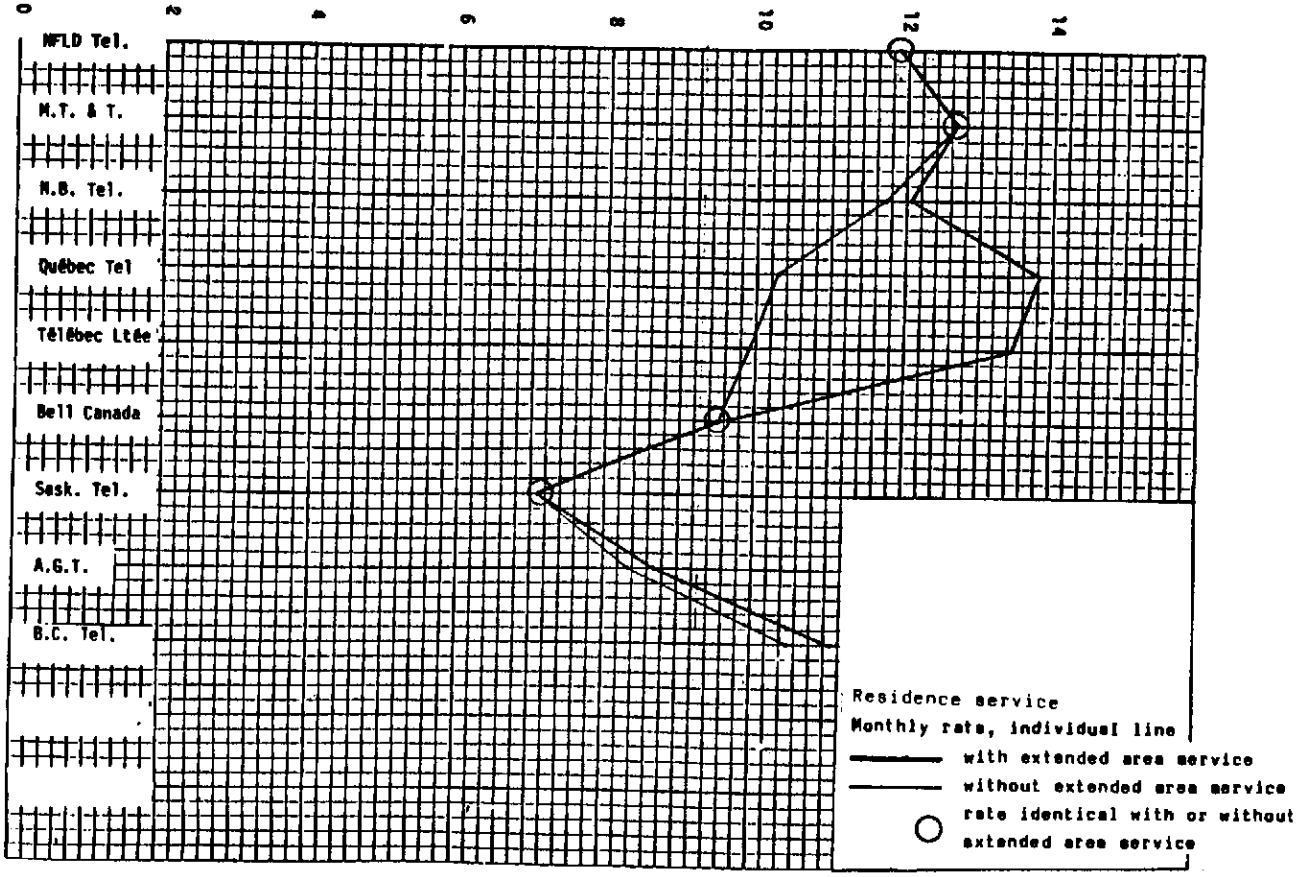
Basic service parameters

	Access lines	Distance (miles)
Exchange: E	51 830	-
Extended area service: none		

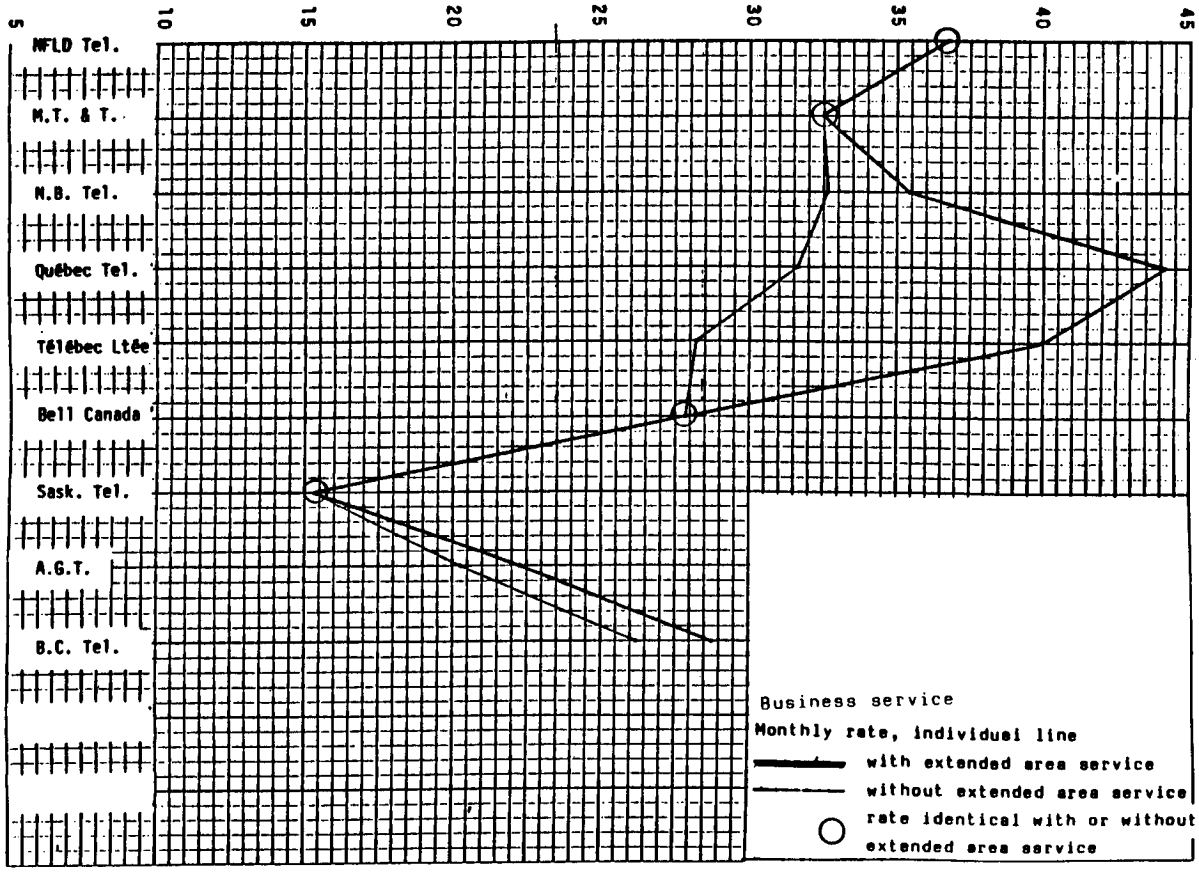
RESIDENCE SERVICE MONTHLY RATE (in dollars)



RESIDENCE SERVICE MONTHLY RATE (in dollars)



BUSINESS SERVICE MONTHLY RATE (in dollars)



APPENDIX B-6 -- EXCHANGE F

EXCHANGE: F (150 600 access lines)

RATES WITH EXTENDED AREA SERVICE

	1 R	2 R	1 A	2 A	Rate Group
NFLD Tel.	N/A	N/A	N/A	N/A	N/A
Island Tel.	N/A	N/A	N/A	N/A	N/A
N.T. & T.	13.10	11.80	37.50	N.D.	6
N.B. Tel.	N/A	N/A	N/A	N/A	N/A
Québec-Téléphone	13.40	12.15	40.80	34.75	14 D
Télébec Ltée	N/A	N/A	N/A	N/A	N/A
Bell Canada	10.70	6.70	34.45	N.D.	10
Manitoba Tel	N/A	N/A	N/A	N/A	N/A
Sask. Tel	11.95	N.D.	28.35	N.D.	3
A.G.T.	9.80	N.D.	25.31	N.D.	8
B.C. Tel	13.50	8.45	41.25	N.D.	11

Basic service parameters

Exchange: F		Access lines	Distance (miles)
Extended area service with		2 100	-
1 exchange :	2	148 500	12.4
	TOTAL	150 600	

EXCHANGE: F (2 100 access lines)

RATES WITHOUT EXTENDED AREA SERVICE

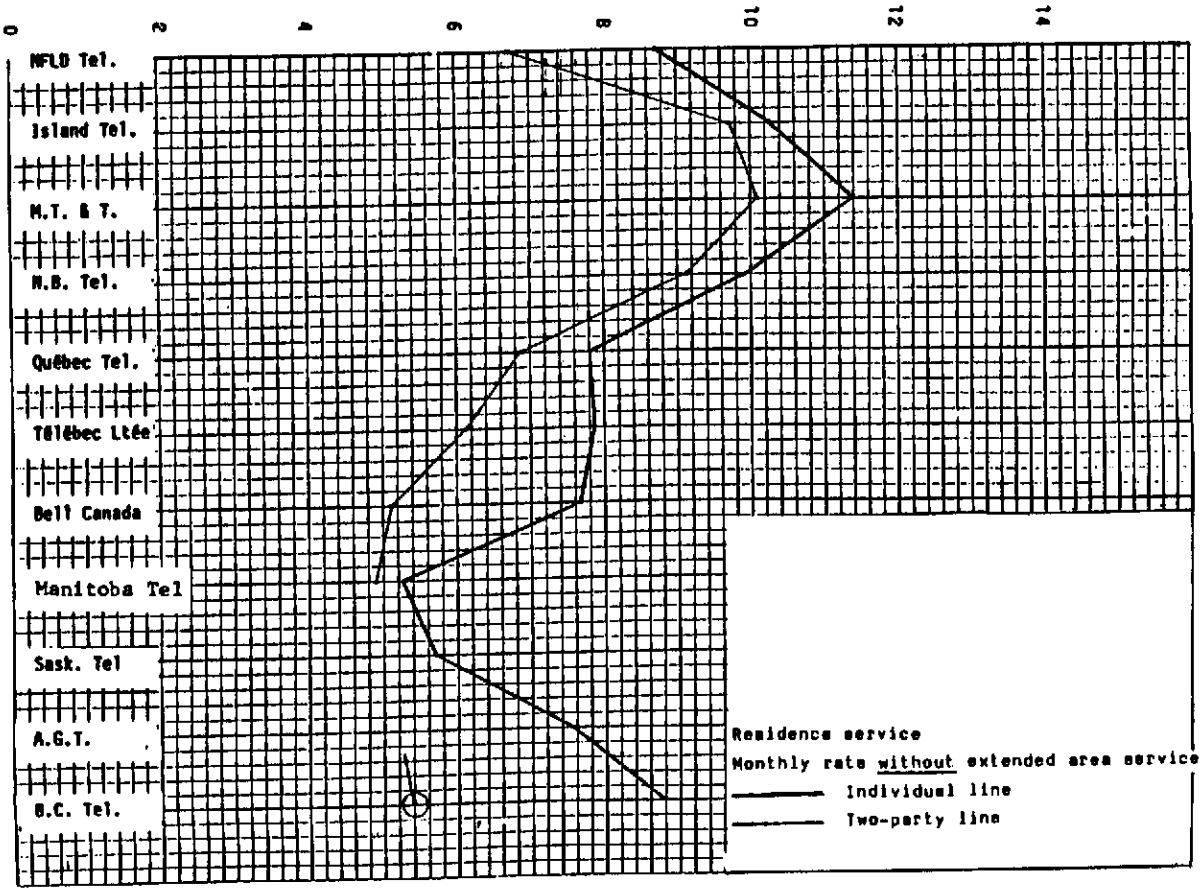
	1 R	2 R	1 A	2 A	Rate Group
NFLD Tel.	8.75	6.75	19.00	12.45	1
Island Tel.	10.25	9.75	21.90	20.40	2
N.T. & T.	11.40	10.10	21.15	19.85	2
N.B. Tel.	9.95	9.15	20.70	19.55	2
Québec-Téléphone	7.80	6.85	16.10	12.70	3
Télébec Ltée	7.85	6.15	16.40	13.25	3
Bell Canada	7.65	5.15	16.70	12.70	4
Manitoba Tel	5.25	4.90	10.30	N.D.	4
Sask. Tel.	5.70	N.D.	10.95	N.D.	1
A.G.T.	7.56	N.D.	14.13	N.D.	2
B.C. Tel.	8.80	5.40	18.45	N.D.	3

Basic service parameters

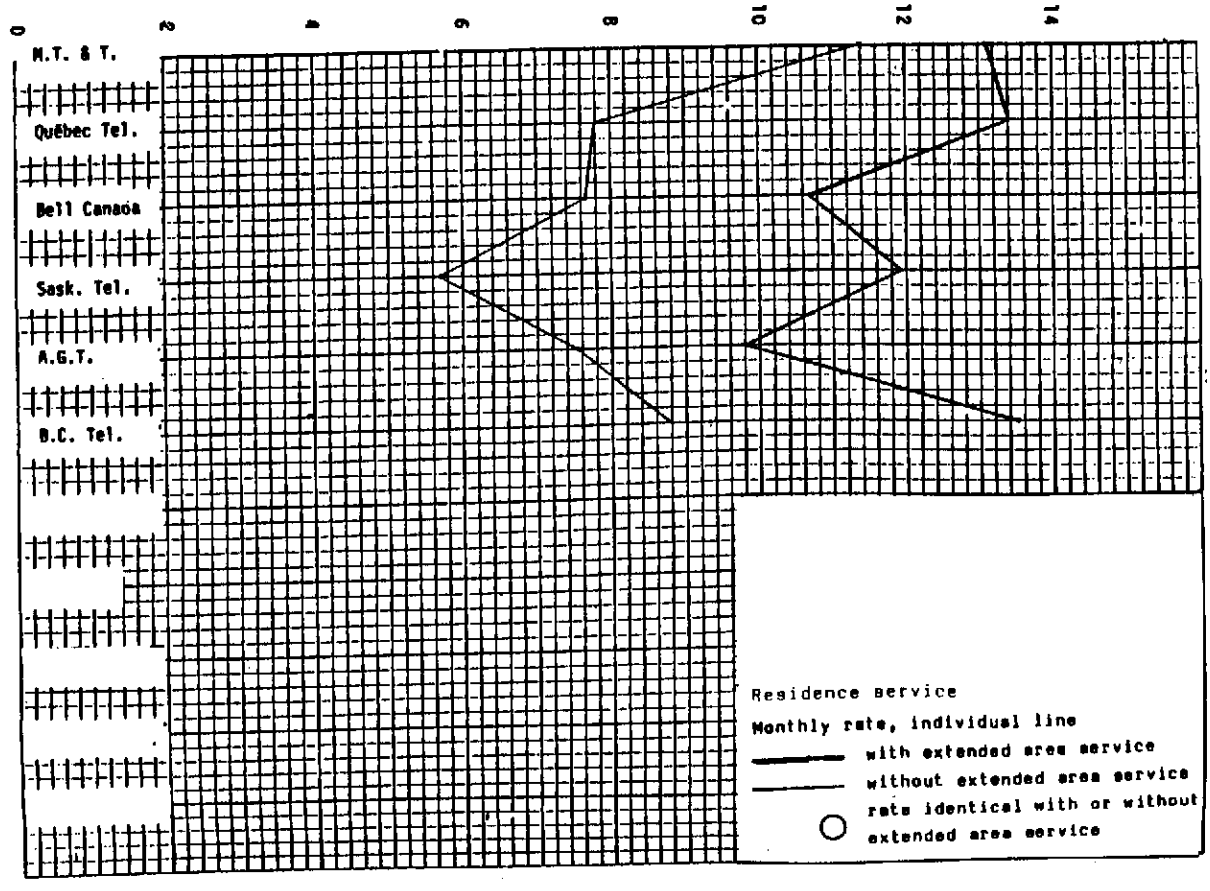
Exchange: F	Access lines	Distance (miles)
Extended area service: none	2 100	-

APPENDIX B-6 (Continued)

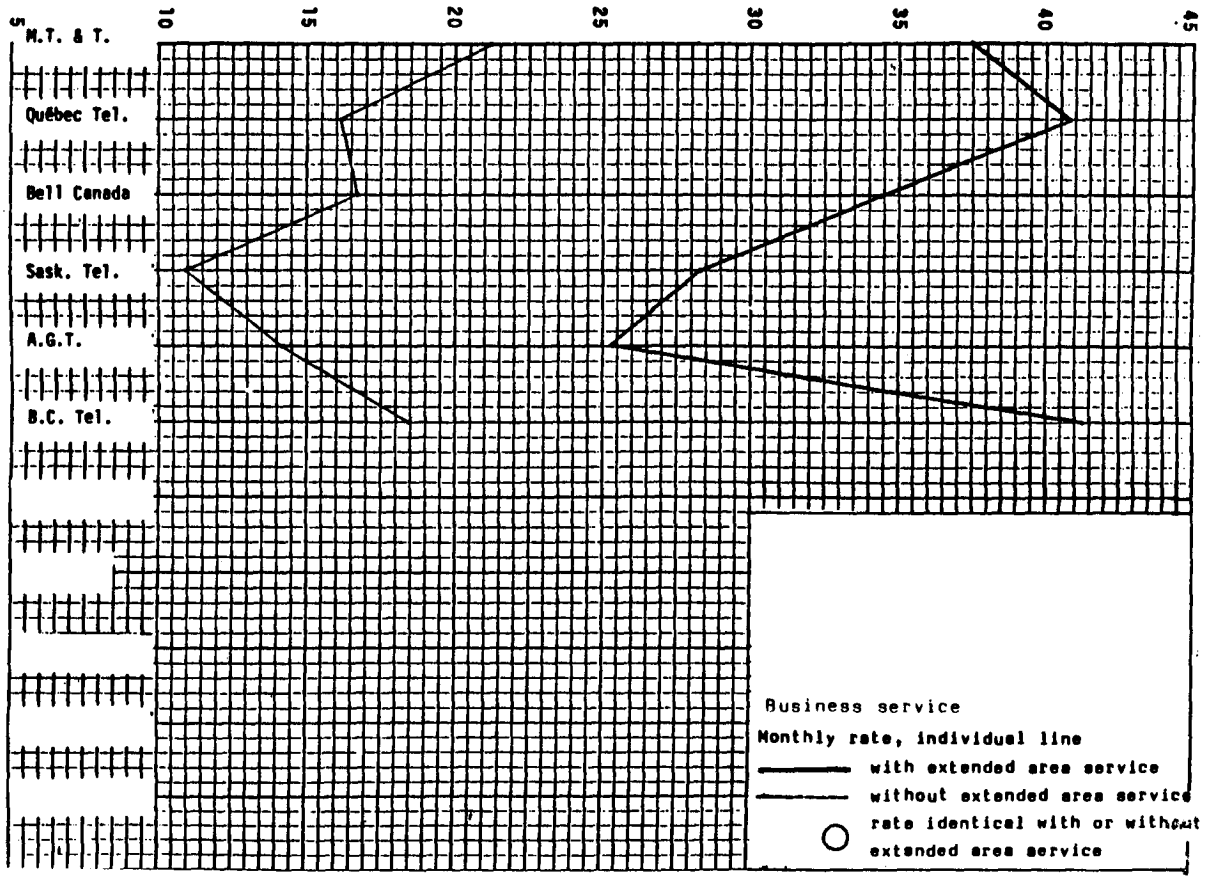
RESIDENCE SERVICE MONTHLY RATE (in dollars)



RESIDENCE SERVICE MONTHLY RATE (in dollars)



BUSINESS SERVICE MONTHLY RATE (in dollars)



CHAPTER 3

Alternative
Long-Distance and Local Rates

CHAPTER 3

TABLE OF CONTENTS

3.1 Introduction

This chapter summarizes the results of simulations performed with a financial model developed and operated by Peat, Marwick and Partners, to evaluate the impact of a range of scenarios in which long-distance rates are assumed to be reduced. For each scenario, the impact on the local rates of the major telephone company operating in each province is estimated for a specific change to long-distance rates.

The model used in the study was originally developed by Peat Marwick for a federal-provincial study of competition in long-distance telephone services (known as the "Competition Study").[1] Since then it has been refined and was subsequently used in a study for the Department of Communications to explore the effects of changing local and long-distance rate relationships and alternative methods of revenue settlement among telephone companies.

A brief description and assessment of the model is provided below. This is followed by a presentation of the results of the simulations undertaken.

3.2 Financial Model and Its Operation

3.2.1 Model Description

The model estimates the investments, expenses and revenues of the nine major telephone companies serving Canada's provinces. The financial data in the model do not include those of the "independent telephone companies" operating primarily in Newfoundland, Quebec, Ontario, Alberta and British Columbia. Due to the confidentiality of more recent data, the model is based on 1978 data. In that year, the telephone companies disclosed their disaggregated financial data in the course of a CRTC inquiry into revenue settlement practices. Using that starting point, the model was calibrated to produce aggregate company data consistent with those contained in the telephone companies' annual reports for 1984.

Several data were known in the 1978 to 1984 calibration. The growth in the number of subscriber access lines and the increase in intra-company and inter-company traffic were obtained from Statistics Canada and Telecom Canada published statistics. Increases in local rates were obtained from Statistics Canada publications on family expenditures published for 1978 and 1982, and from Statistics Canada price index figures for the period between 1982 and 1984. The

rate increases and traffic growth data were used to produce estimates of increases in local revenues. Inter-company long-distance revenue increases were calculated based on Telecom Canada rate increases and traffic statistics. Increases in intra-company long-distance revenues were calculated using the long-distance revenue statistics published by Statistics Canada.*

For expenses other than depreciation and financial and income tax expenses, the inflation of non-food industrial selling prices was used as a first estimate of unit expense increase factors over the 1978 to 1984 period. Estimated results for 1984 were then modified to reflect each telephone company's published total expense information. Unit expense increase rates differing from the general inflation rate by a range of -10 to +10 per cent were obtained for individual companies.

Investment calculations for 1984 were estimated using a balance-sheet forecasting feature contained in the model. The ratios of growth in real investment to growth in traffic were modified for some companies to reflect actual changes in total investments from 1978 to 1984. Depreciation, financial and income tax expenses were taken from the companies' 1984 annual reports.

3.2.2 Base Projections for 1986

For most of the scenarios in which the model was used, a 1986 test year was employed to estimate the impact on local rates of specific long-distance rate changes. These changes were assumed to occur on a flash cut basis for 1986.

In preparing base case projections for 1986, it was assumed that traffic growth trends observed from 1978 to 1984 continued through 1986. No increase in local or inter-company rates was assumed. The increase in intra-company rates was estimated as a residual so as to balance the telephone companies' income statements. It was found that these rate increases would be small for most companies.

Financial and income tax expenses for 1986 were estimated by assuming that the ratio of expenses to gross investment fell by 0.5 percentage points

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* In these Working Papers, the terms inter-provincial and intra-provincial long-distance calling are used interchangeably with the terms inter-company and intra-company long-distance calling, respectively. Because Bell Canada serves two provinces, the latter terms are more precise.

between 1984 and 1986. The inflation rate in the non-food industry selling price index was used to estimate 1984 to 1986 increases in other expense categories.

3.2.3 Base Projections for 1990

In addition to the 1986 test year scenarios, a number of scenarios were specified for which Peat Marwick was asked to estimate what effect a specific set of long-distance rate changes would have on local rates by 1990. Similar procedures to those described above were used to prepare base case projections for 1990. For long-distance rates, the average annual rate increases experienced in the 1978 to 1986 period were assumed to continue from 1986 to 1990. Long-distance traffic growth rates were estimated based on past growth trends and a prescribed assumption as to demand elasticity. No changes were applied to the ratio of financial and income tax to gross investment percentages unless specified by the scenario. An annual inflation rate of 5 per cent was assumed between 1986 and 1990. The traffic growth trends of the 1978 to 1986 period were assumed to continue to 1990 in the local sector. In the base case, local rates were assumed to increase, on a residual basis, to the extent required to maintain the company's required rate of return.

3.2.4 Modelling Changes to Base Forecasts

In modelling the impact on local rates of specified changes to long-distance rates, it was necessary for Peat Marwick to make certain assumptions as to how long-distance rate changes would affect traffic volumes and, hence, telephone company billed revenues. In this regard, the examination requested Peat Marwick to prepare projections based on three alternative assumptions: demand elasticities of -0.4, -0.8 and -1.3, respectively. As changes in traffic volumes also have an impact on company expenses and investments, it was necessary for Peat Marwick to model this relationship as well. Finally, it was necessary for Peat Marwick to model how changes to billed long-distance revenues and expenses would affect the division of billed long-distance revenues made under the Telecom Canada Revenue Settlement Plan and other agreements for the sharing of long-distance revenues. For this purpose, it was assumed that the current Revenue Settlement Plan would remain unchanged.

3.2.5 Assessing the Model

In assessing the reliability of projections, a number of tests were made, including a comparison of inputs and outputs with other available data and an analysis of the methodology underlying the Peat Marwick model. During the course of these tests it became apparent that improvements to the projections would have been possible if actual disaggregated 1984 telephone company data had been provided to Peat Marwick by the examination and if further refinements to the model had been made. Nonetheless, it was concluded that the projections provided by Peat Marwick were sufficiently reliable to serve the immediate purposes of the examination. That is to say, the projections appear accurate within a range of reasonableness, and they provide useful approximations as to local rate levels and the impact of long-distance rate changes on local rates.

While the extent of accuracy cannot be precisely determined, a reasonable judgement would be that if long-distance rates for 1986 were to change in the manners specified, the actual required dollar changes to the average local rate in any province would be within 25 per cent of the amount projected by Peat Marwick. In other words, if Peat Marwick's projection was that local rates would need to increase from a level of $10 to a level of $14, one could be reasonably confident that the actual increase required would be in the range of $3 to $5.

For 1990, less confidence may be had in the Peat Marwick projections. This is due to the greater compounding effects of any input data errors and to the inherently greater inaccuracy of more distant projections.

3.3 Presentation of Results

The results of the Peat Marwick simulations are summarized in this section to illustrate how various long-distance rate changes would affect local rates. In presenting these results, a number of simplifying assumptions have been made which will also be discussed.

3.3.1 Elasticity of Demand

While Peat Marwick, at the request of the examination, made its projections using three alternative assumptions as to the elasticity of demand for long-distance service, the results are presented, except where noted, only

for the assumption that demand elasticity would be in the order of -0.8. This is done for the convenience of presentation only, and it does not reflect any judgement as to what the demand elasticity actually is. Subsection 3.4.3 presents, for one set of scenarios, estimates based on the -0.8 assumption and for assumptions that long-distance demand elasticity equals -0.4 or -1.3. This is done to give a broader indication of the impact of the elasticity assumption on the estimates.

3.3.2 Base Case Local Rate Levels

For each telephone company, Peat Marwick's base case projections for 1986 and 1990 specified total local revenues and number of access lines by class of service. Projected local revenues were not, however, broken down by residence and business service or by different classes of business service. While it was therefore possible for the base case scenarios to calculate the average level of local rates from these data, this could not be done separately for business and residence rates without making additional assumptions. The assumption made in this regard was that, for each telephone company, the average rate for an individual business or Centrex line is three times that for a residence line and half that of a private branch exchange (PBX). Using this assumption, one that is reasonably accurate, it was possible to use the Peat Marwick projections to estimate average local rates for residence and business services in the 1986 and 1990 base cases. In employing these estimates, it should be noted that the average business rate thereby calculated is a weighted average of the rates for individual business lines, Centrex lines and PBX trunks and will be higher than the average individual-line rate but below the average PBX rate.

3.3.3 Assignment of Revenue Shortfall

For each scenario considered, Peat Marwick calculated, by telephone company, the net revenue shortfall that would arise because of specified long-distance rate changes. To estimate the impact of such changes on average business and residence local rates, it was then necessary to specify, assuming that local services would be held responsible for the shortfall, how the

shortfall could be assigned between business and residence local service.* The results described in the next section were calculated separately for each of the alternative assumptions. These assumptions were chosen for the purpose of presentation and not because of any intrinsic merit. The two alternative assumptions made were: (1) that average residence and average business local rates would rise by the same dollar amount, or (2) that average residence and average business local rates would rise by the same percentage amount.

3.4 1986 Projections

3.4.1 Reductions in Inter-Provincial Rates

Figures 3.1 through 3.8 provide estimates of the percentage increase in, and level of, business and residence local rates resulting from decreases to inter-provincial long-distance rates of up to 50 per cent. Figures 3.1 to 3.4 are based on the assumption that the dollar increase to residence and business rates would be the same. Figures 3.5 to 3.8 are based on the assumption that the percentage increase to residence and business rates would be the same. The Appendix to this chapter gives this information in tabular form (see Tables A.1 through A.4).

3.4.2 Reductions in Inter-Provincial and Intra-Provincial Rates

Figures 3.9 through 3.16 provide estimates of the percentage increase in, and level of, business and residence local rates resulting from decreases to inter-provincial long-distance rates of up to 50 per cent together with decreases in intra-provincial long-distance rates of up to 20 per cent. Figures 3.9 to 3.12 are based on the assumption that the monthly dollar increase to residence and business local rates would be the same, while Figures 3.13 to 3.16 are based on the assumption that the percentage increase to residence and business rates would be the same. This information is provided in tabular form in Tables A.5 through A.8 in the Appendix.

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* In the case of AGT, for computational reasons and because AGT provides long-distance service to customers of 'edmonton telephones', it was assumed that 30 per cent of any AGT revenue shortfall, due to long-distance rate reductions would be borne by 'edmonton telephones' subscribers. The 30 per cent value was based on the approximate number of equivalent subscriber telephones in the city of Edmonton relative to the province of Alberta.

FIGURE 3.1
1986 Residence Local Rate Changes
Assuming Equal Dollar Local Rate Increase

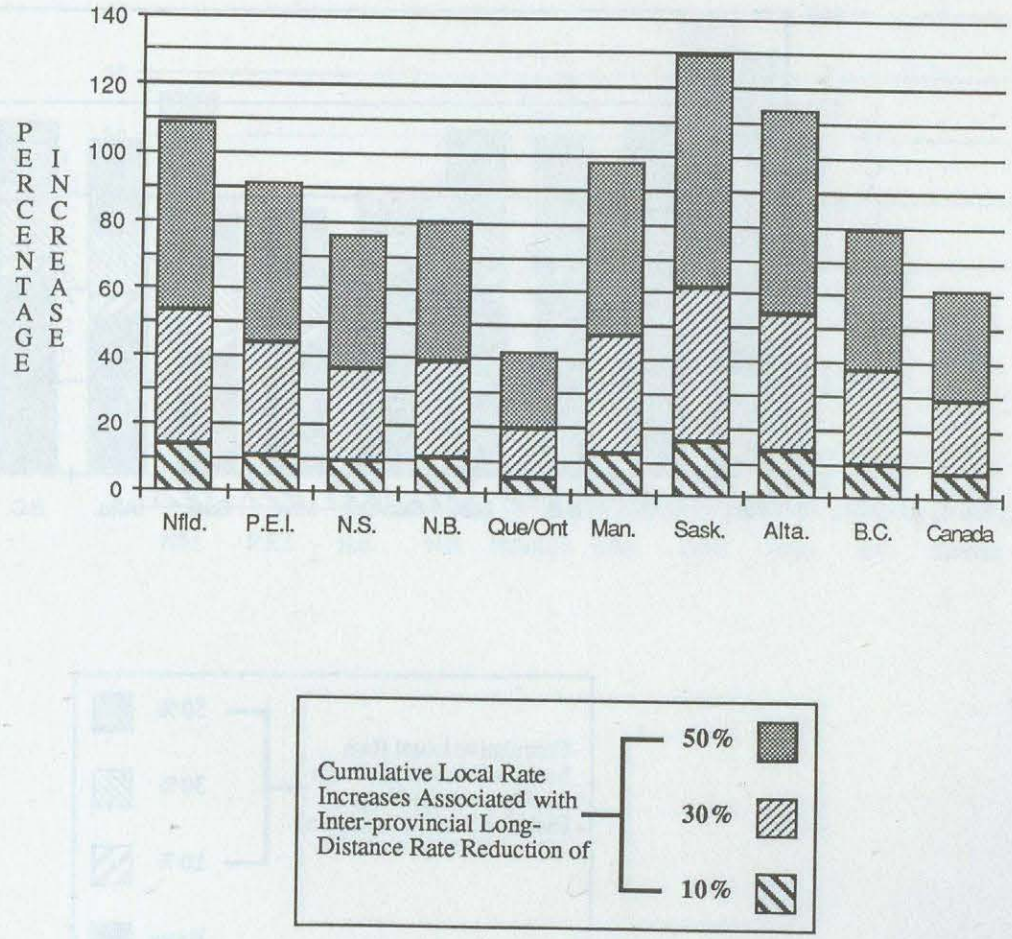
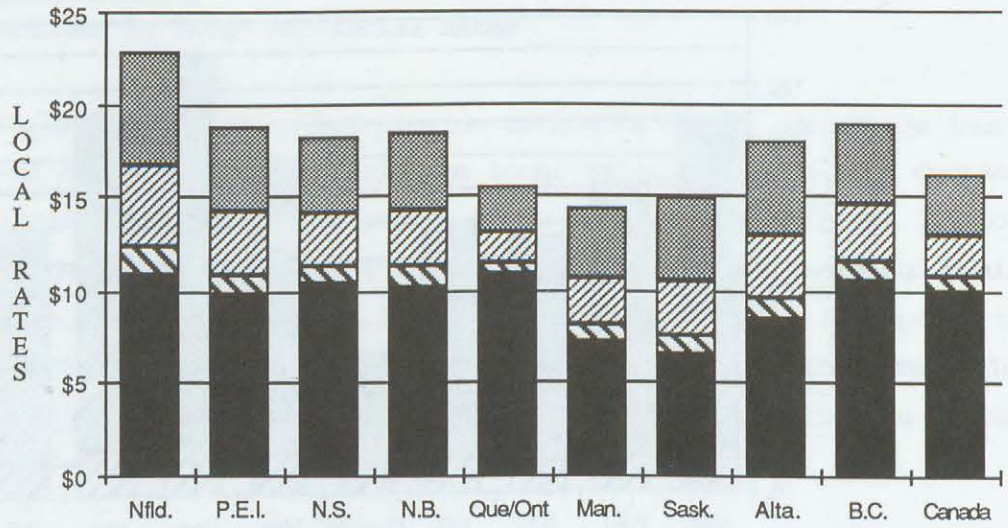


FIGURE 3.2
1986 Residence Local Rates
Assuming Equal Dollar Local Rate Increase



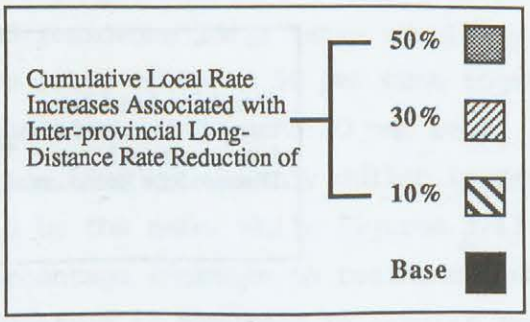


FIGURE 3.3
1986 Business Local Rate Changes
Assuming Equal Dollar Local Rate Increase

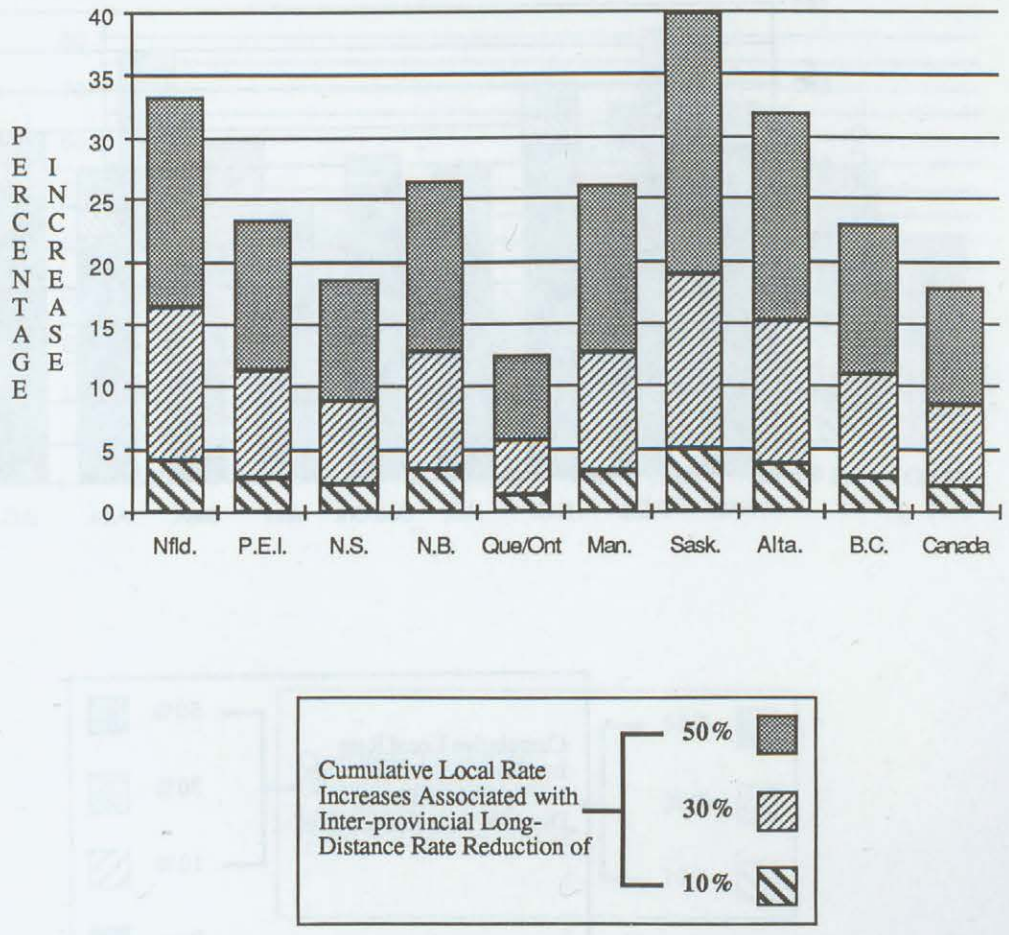
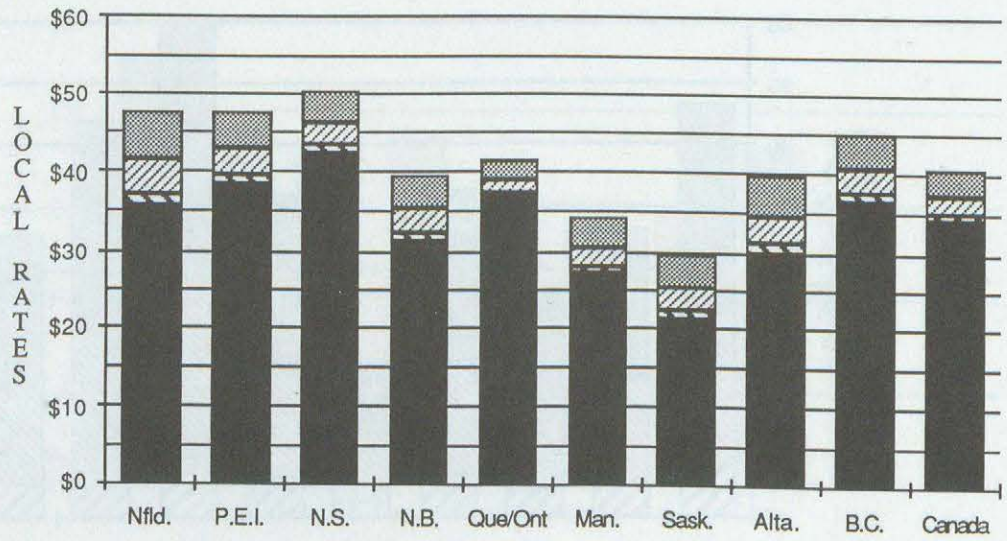


FIGURE 3.4
1986 Business Local Rates
Assuming Equal Dollar Local Rate Increase



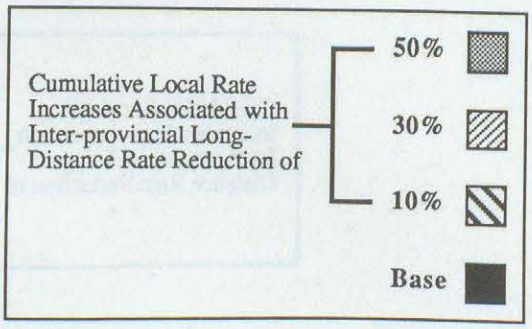


FIGURE 3.5
1986 Residence Local Rate Changes
Assuming Equal Percentage Local Rate Increase

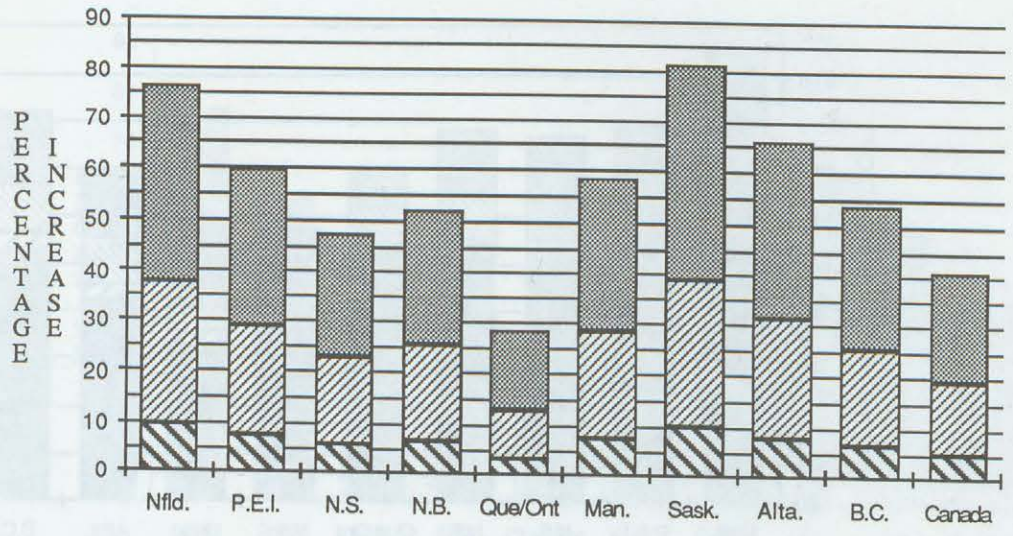


FIGURE 3.6
1986 Residence Local Rates
Assuming Equal Percentage Local Rate Increase

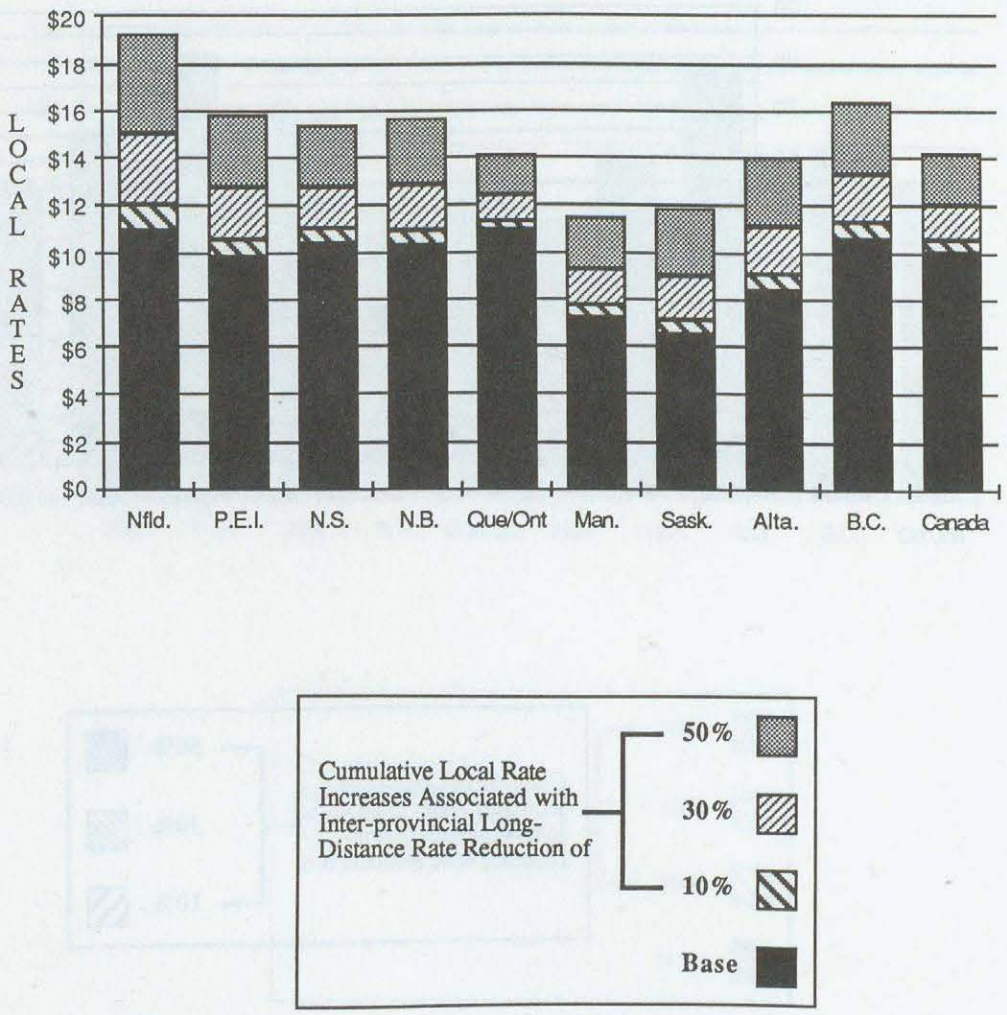


FIGURE 3.7
1986 Business Local Rate Changes
Assuming Equal Percentage Local Rate Increase

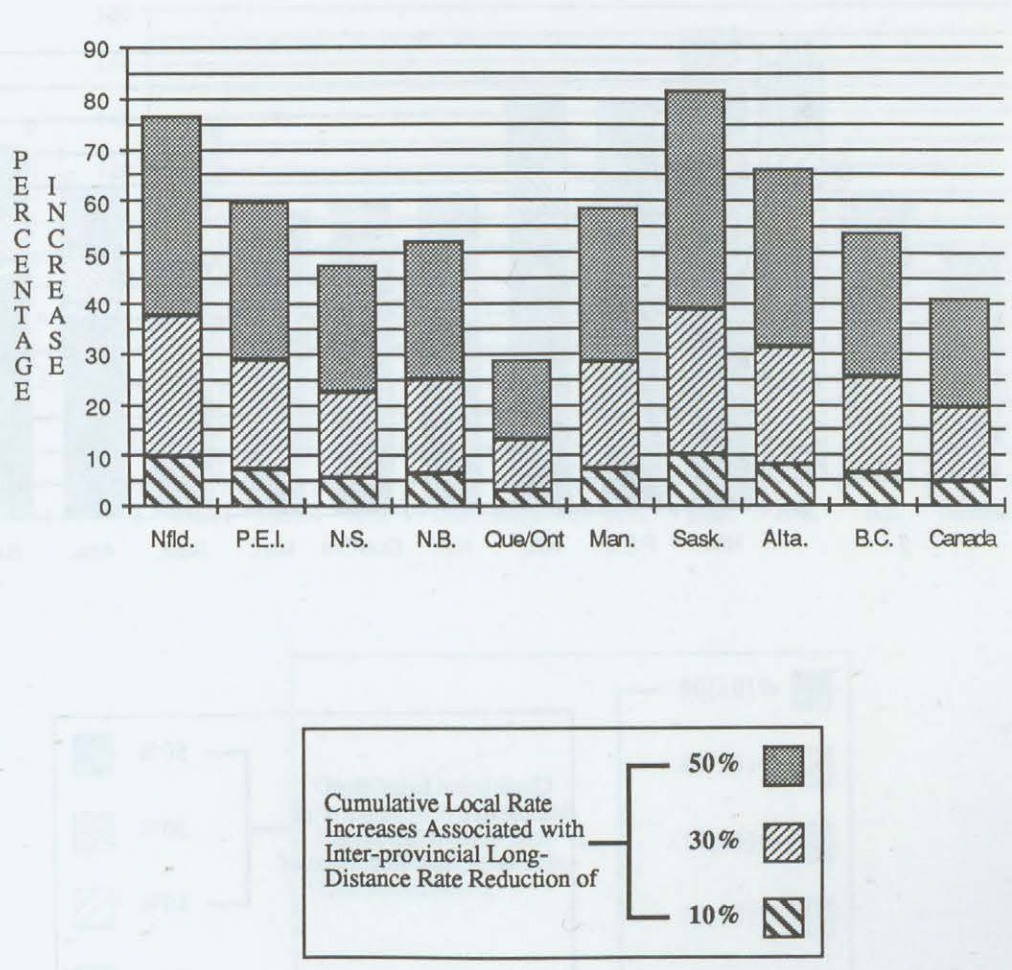
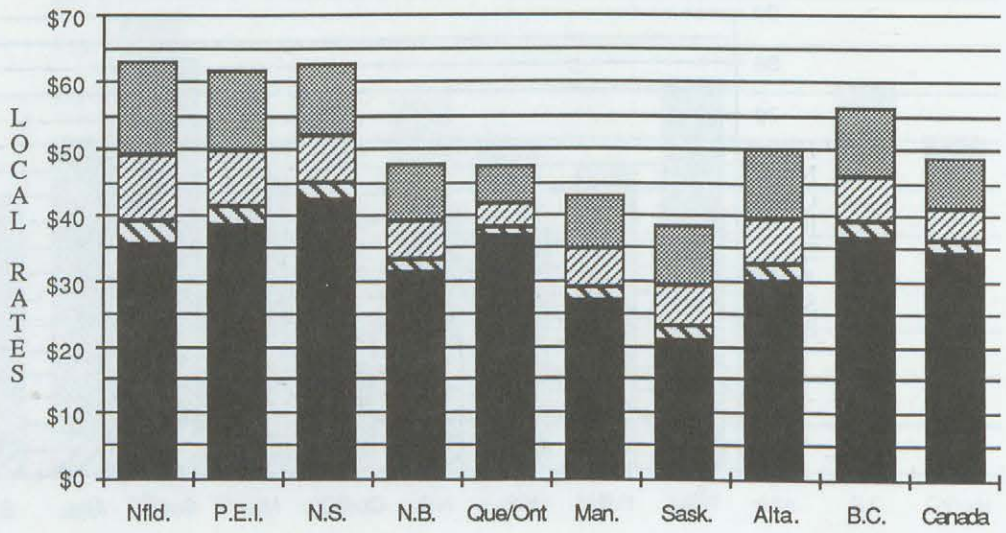


FIGURE 3.8
1986 Business Local Rates
Assuming Equal Percentage Local Rate Increase



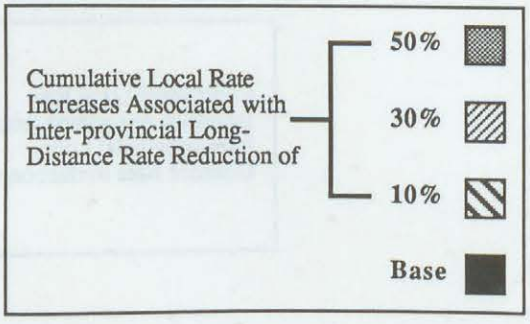
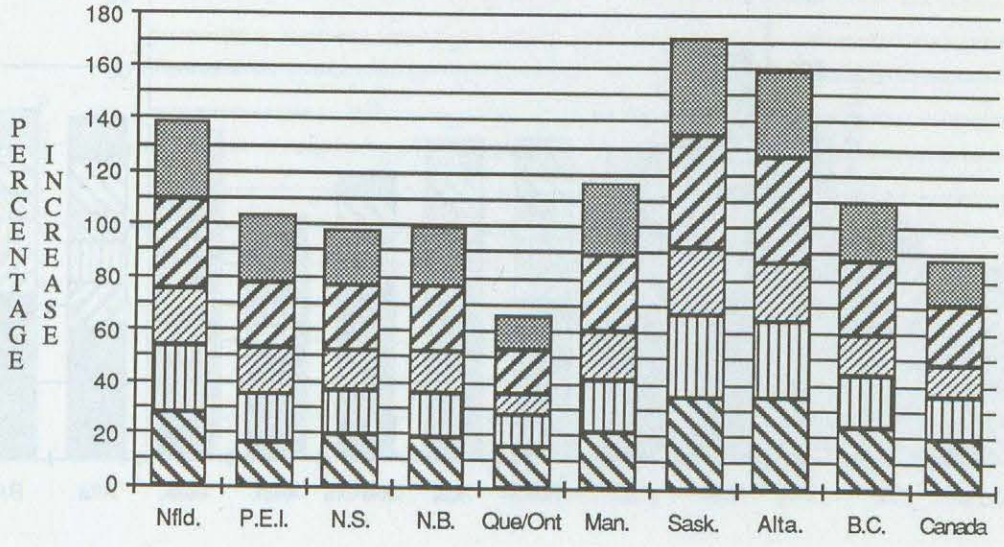


FIGURE 3.9
1986 Residence Local Rate Changes
Assuming Equal Dollar Local Rate Increase



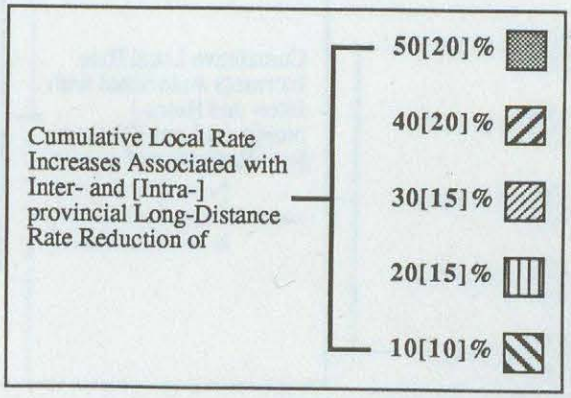


FIGURE 3.10
1986 Residence Local Rates
Assuming Equal Dollar Local Rate Increase

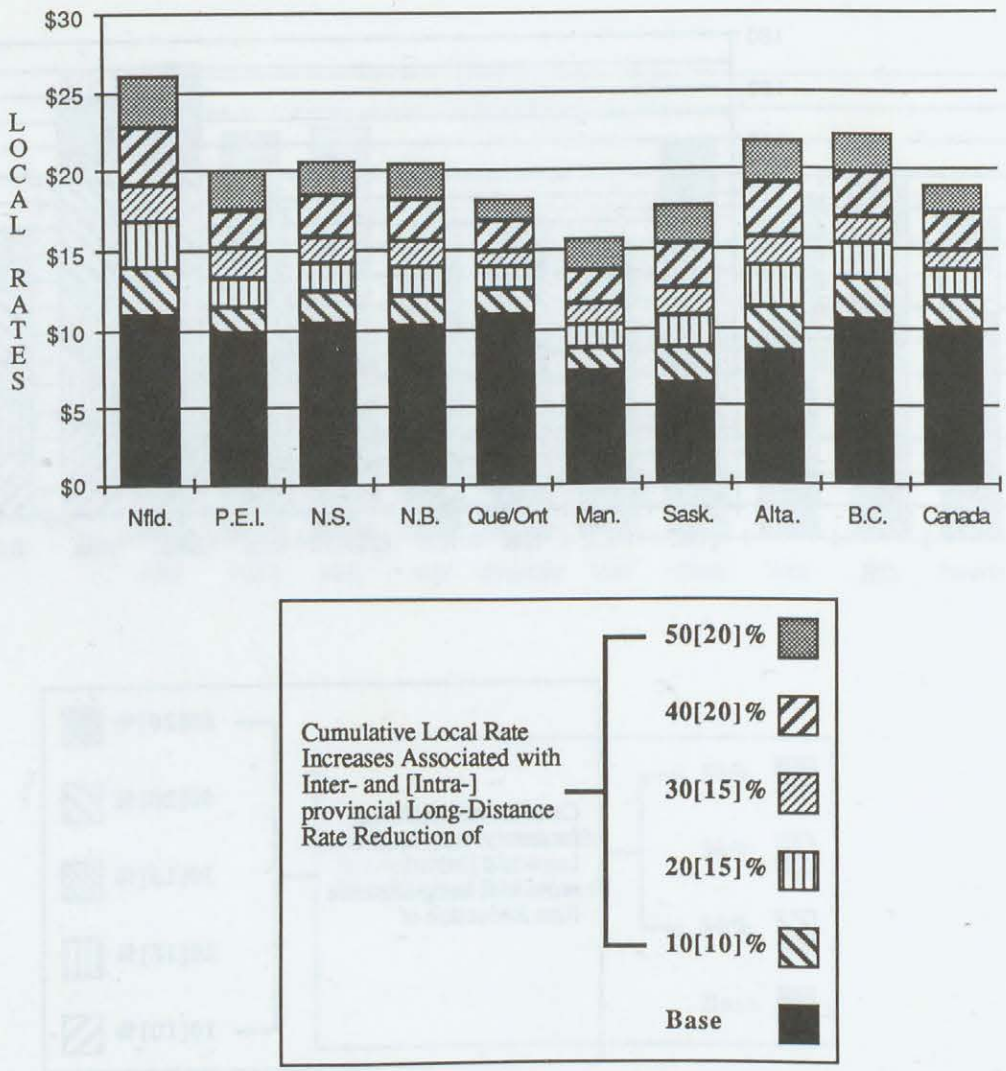
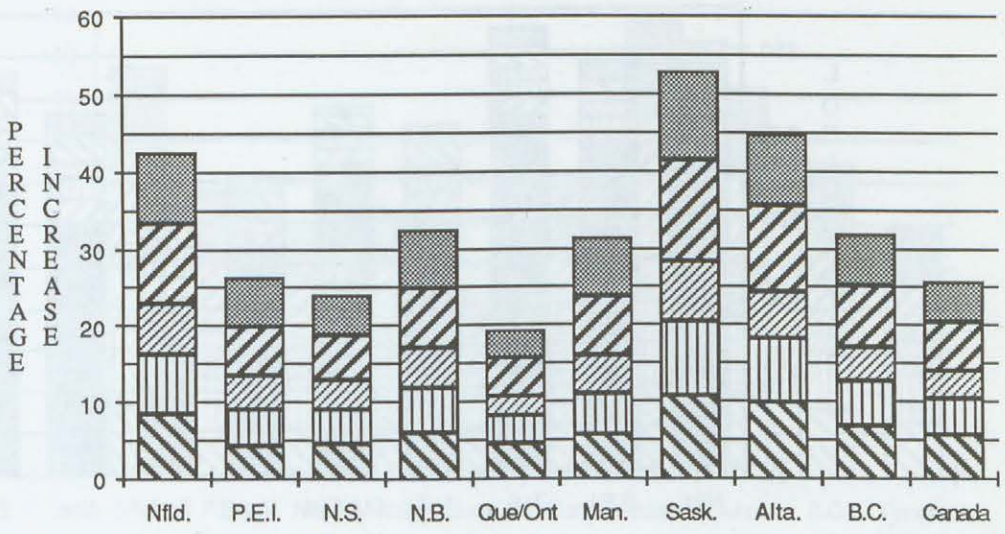


FIGURE 3.11
1986 Business Local Rate Changes
Assuming Equal Dollar Local Rate Increase



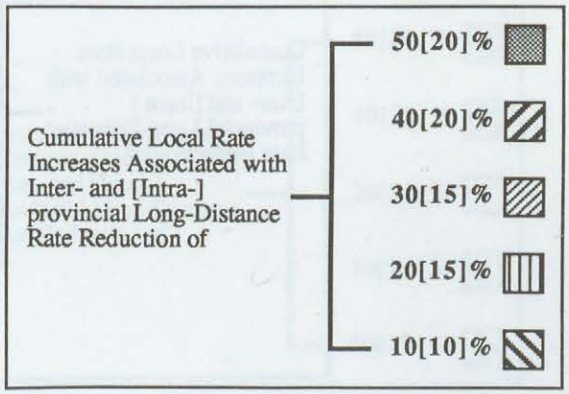


FIGURE 3.12
1986 Business Local Rates
Assuming Equal Dollar Local Rate Increase

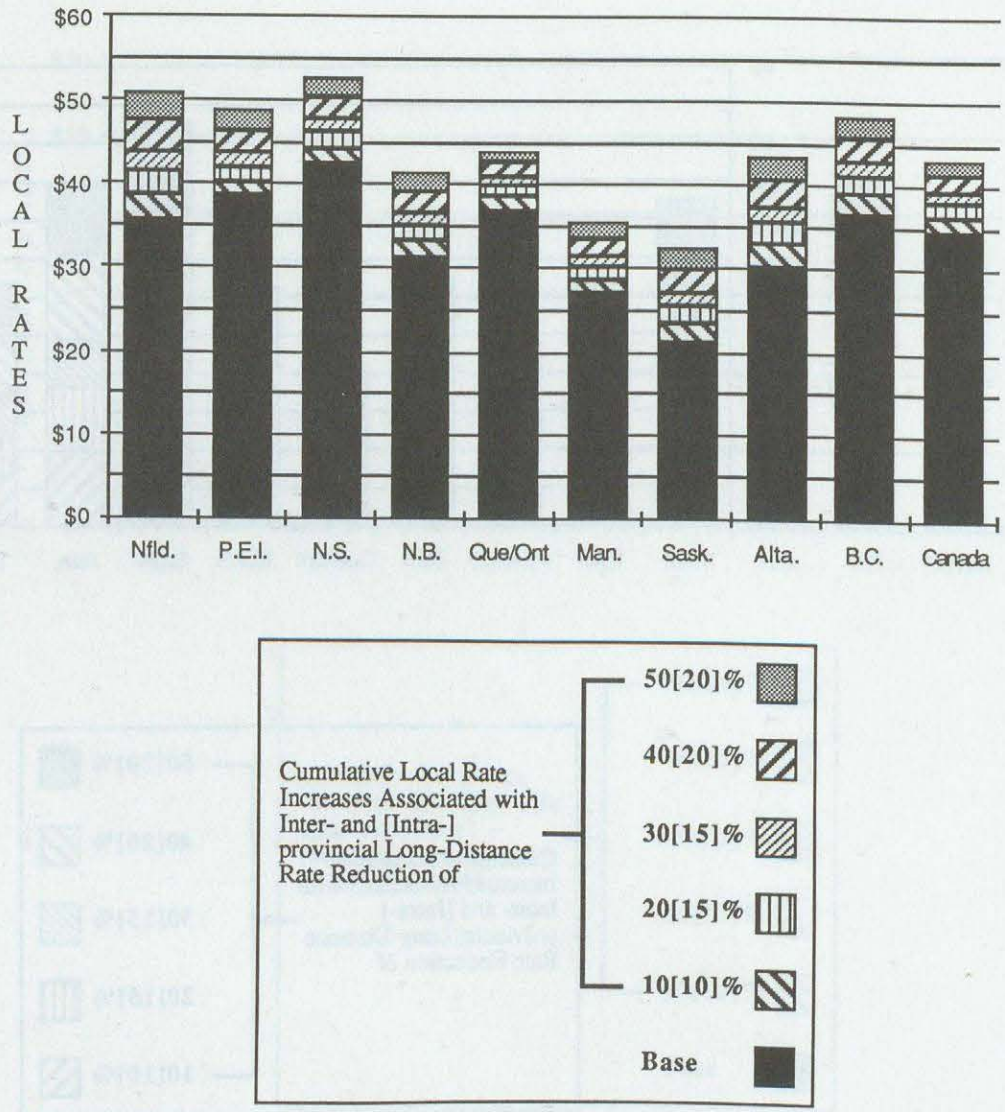
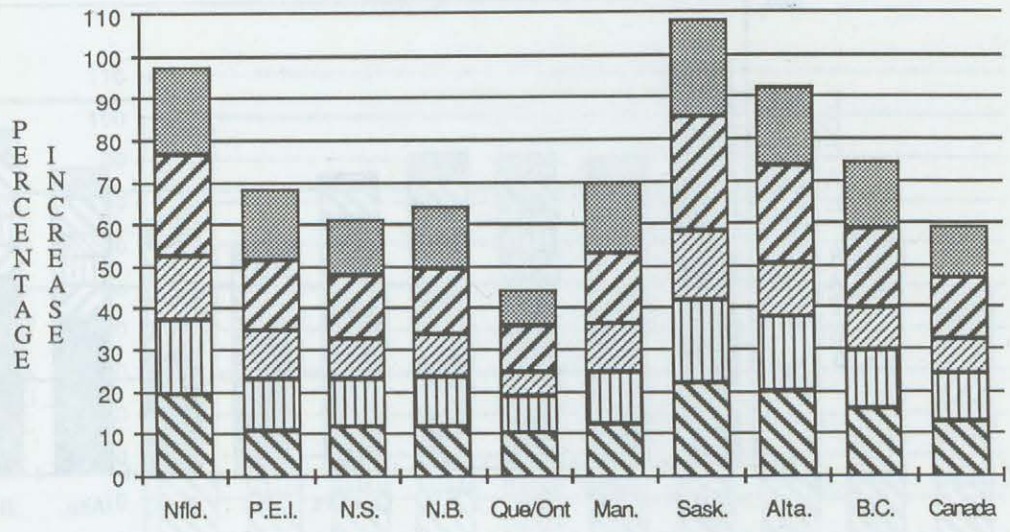


FIGURE 3.13
1986 Residence Local Rate Changes
Assuming Equal Percentage Local Rate Increase



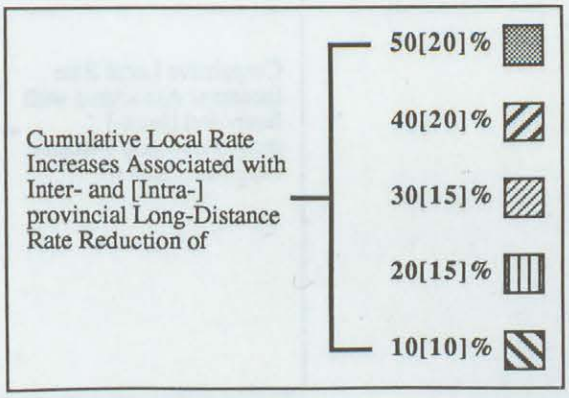


FIGURE 3.14
1986 Residence Local Rates
Assuming Equal Percentage Local Rate Increase

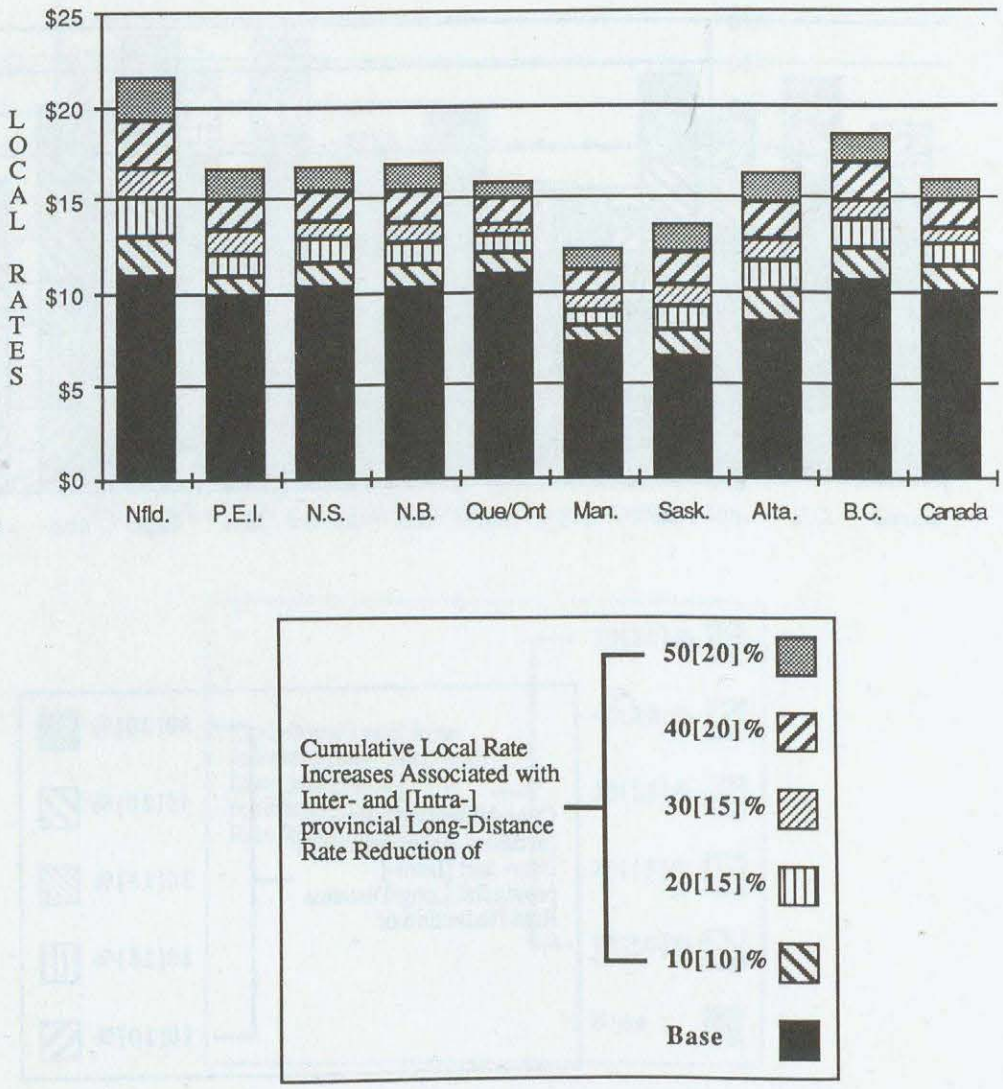
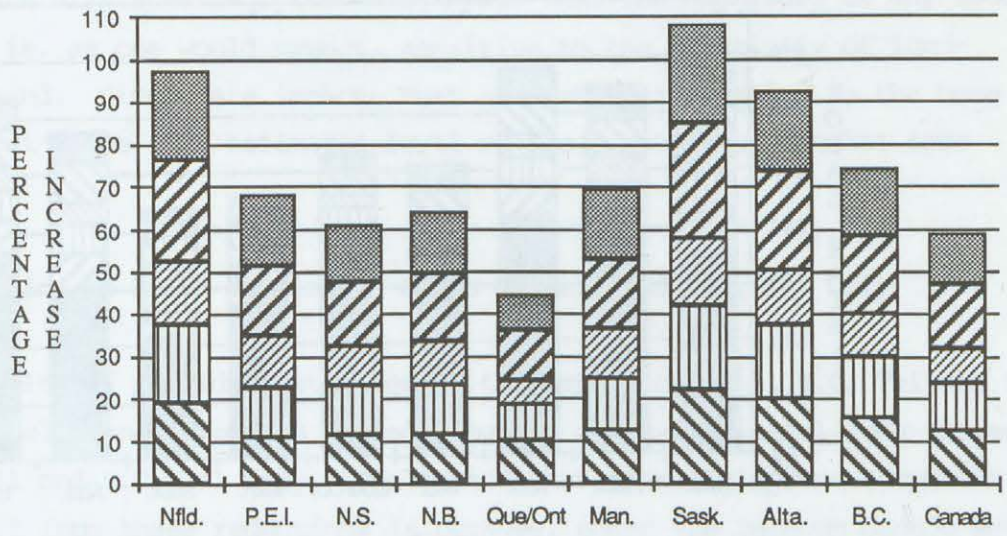


FIGURE 3.15
1986 Business Local Rate Changes
Assuming Equal Percentage Local Rate Increase



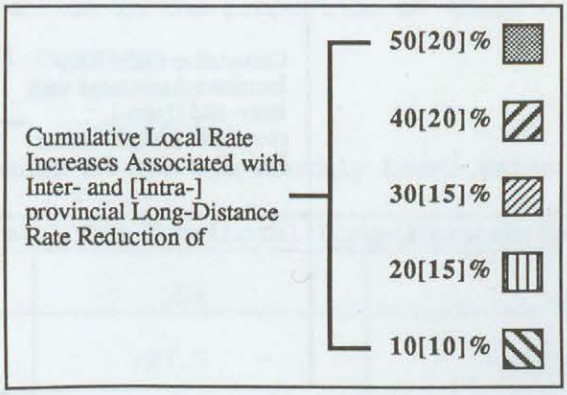
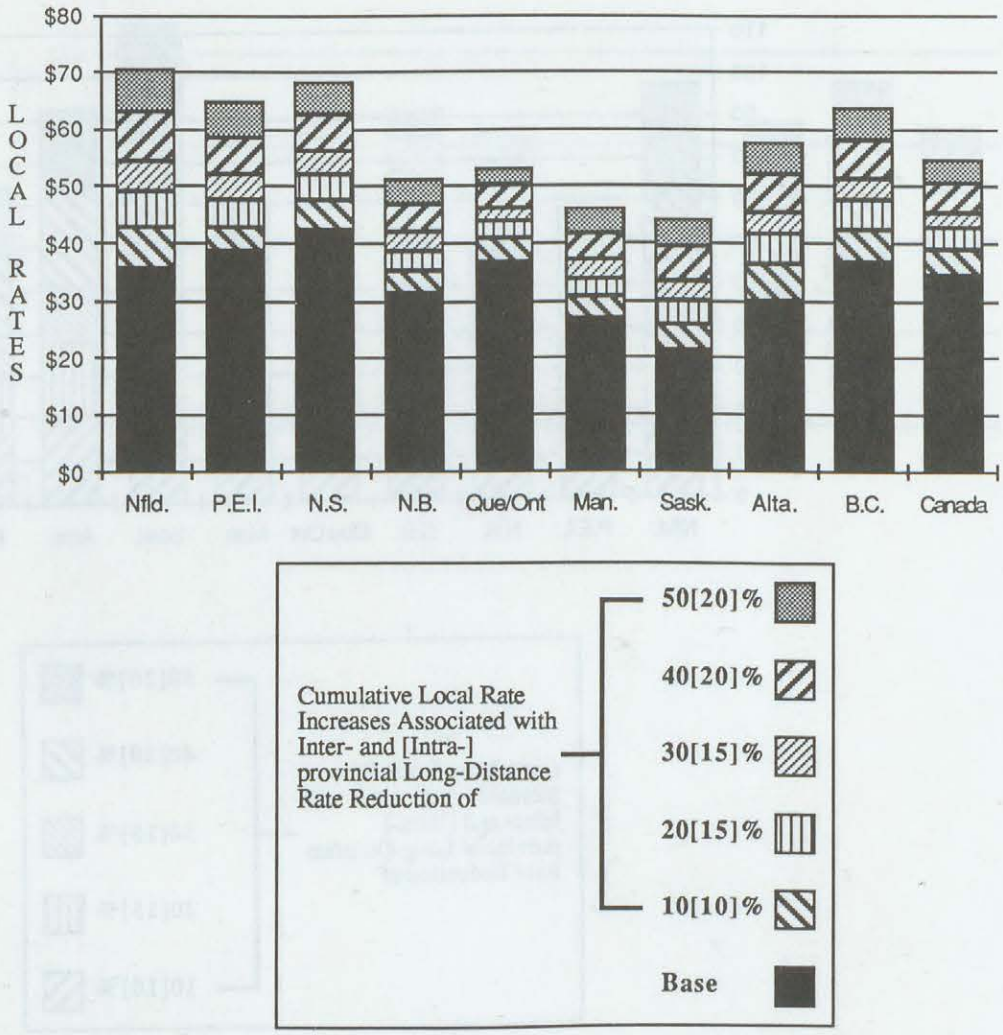


FIGURE 3.16
1986 Business Local Rates
Assuming Equal Percentage Local Rate Increase



3.4.3 Sensitivity of Results to the Elasticity Assumption

As discussed in section 3.3, for the purposes of simplicity of presentation, the results presented in this and the following sections have been given only for the assumption that the elasticity of demand for long-distance service is -0.8. The results presented in Tables A.9 and A.10 in the Appendix show, for selected scenarios, the sensitivity of monthly local residence rates to this assumption.

Generally speaking, it would appear that the magnitute of any local rate impact is, as one would expect, sensitive to the elasticity of long-distance demand. Given rate impacts that are small in relation to the base level of local rates, the estimated level of local rates is somewhat less sensitive.

3.4.4 Reduction to Intra-Provincial Rates of Bell and B.C. Tel Only

Table 3.1 provides estimates of the impact on Bell, B.C. Tel and the other major telephone companies of reducing the intra-provincial long-distance rates of Bell and B.C. Tel only. The reason that other telephone companies would benefit from these reductions is because, under the Telecom Canada Revenue Settlement Plan, increases in Bell or B.C. Tel's intra-provincial long-distance traffic would result in a reduction in the proportion of their costs assigned for recovery from inter-provincial revenues.

TABLE 3.1
Percentage Change in Average Monthly Local Rates

	Bell/B.C. Tel Intra-Provincial Long-Distance Rate Reduction		
	10%	30%	50%
Bell	+ 7.44	+27.5	+56.14
B.C. Tel	+10.16	+36.63	+73.85
Other Telephone Companies	- 0.96 to - 1.89	- 2.94 to - 5.01	- 4.93 to - 8.47

3.4.5 Reduction to Intra-Provincial Long-Distance Rates of Bell and B.C. Tel and to all Inter-Provincial Long-Distance Rates

The local rate impact under this scenario would not, except for Bell and B.C. Tel, differ substantially from those discussed in section 3.4.1 — i.e. where only inter-provincial rates are changed. Table 3.2 gives estimates of the local rate impact on Bell and B.C. Tel.

TABLE 3.2
Percentage Increase in Average Monthly Local Rates

	Reduction to Inter-Provincial and Bell/B.C. Tel Intra-Provincial Long-Distance Rates		
	10%	30%	50%
Bell	10.78	40.51	83.72
B.C. Tel	16.64	61.30	125.23

3.4.6 Increases to Inter-Provincial and Intra-Provincial Long-Distance Rates

Table 3.3 provides estimates of the reduction to average monthly local rates that would result from increases to long-distance rates of 10 and 20 per cent.

TABLE 3.3
Percentage Reduction in Average Monthly Local Rates

	Increase in Inter-Provincial and Intra-Provincial Long-Distance Rates	
	10%	20%
Newfoundland	16.83	30.04
Prince Edward Island	9.40	16.47
Nova Scotia	10.27	18.09
New Brunswick	9.63	17.07
Quebec/Ontario	8.17	14.32
Manitoba	9.82	17.50
Saskatchewan	17.64	31.32
Alberta	16.50	29.40
British Columbia	12.24	21.71
CANADA	10.29	18.16

3.5 1990 Projections

In addition to developing estimates as to how local rates would be affected by a flash cut to long-distance rates in 1986, a number of other scenarios involving more gradual reductions to long-distance rates were posited. For instance, Peat Marwick's estimates were used to calculate how local rates would differ by 1990 under these alternative scenarios as compared to a base case scenario in which long-distance rates were assumed to rise at a rate equal to historical trends. The specific scenarios considered were: (a) a freeze on inter-provincial long-distance rates; (b) a freeze on inter-provincial and intra-provincial long-distance rates; (c) a freeze on the contribution from inter-provincial long-distance rates to other services; and (d) a freeze on the contribution from inter-provincial and intra-provincial long-distance rates.*

Figures 3.17 to 3.36 show the expected impact, by province, of each scenario in terms of 1990 local rate levels for residence and business services. Results are given only for the assumption that equal percentage increases would be applied to residence and business local rates. (The tables in the Appendix also provide results under the assumption that equal dollar increases would be applied to business and residence rates.)

In calculating 1990 base case rates, the corresponding assumption was employed to determine the extent to which increases in local rates between the 1986 and the 1990 base case would be divided between business and residence local service. Tables B.1 through B.8 in the Appendix contain the results for 1990 in tabular form.

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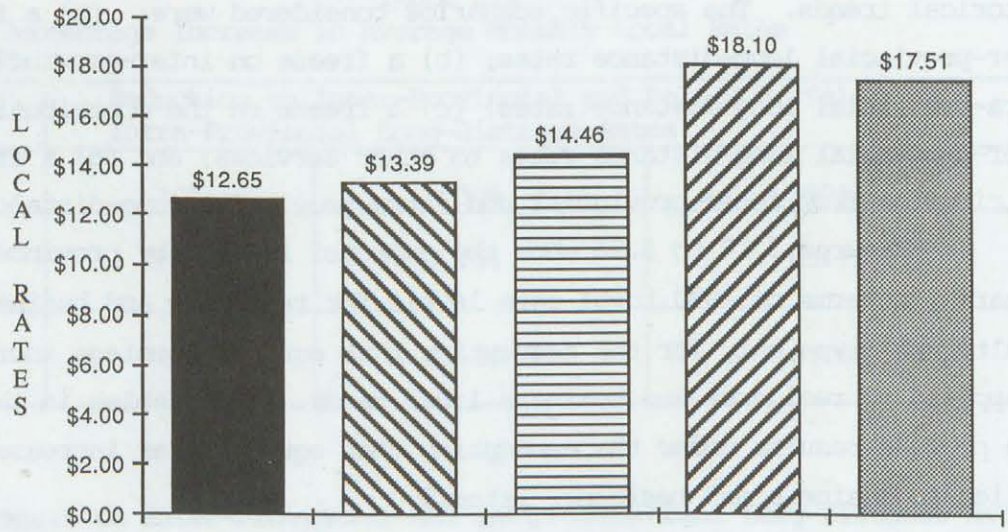
* The level of contribution was calculated based on Peat Marwick's assignment of costs and revenues. This does not necessarily correspond exactly to other definitions of contribution levels.

FIGURE 3.17
1990 Residence Local Rates
Assuming Equal Percentage Local Rate Increase



NEWFOUNDLAND

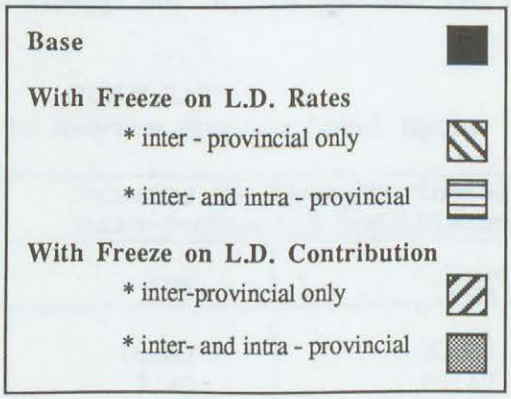


FIGURE 3.18
1990 Residence Local Rates
Assuming Equal Percentage Local Rate Increase

FIGURE 3.19
1990 Residence Local Rates
Assuming Equal Percentage Local Rate Increase

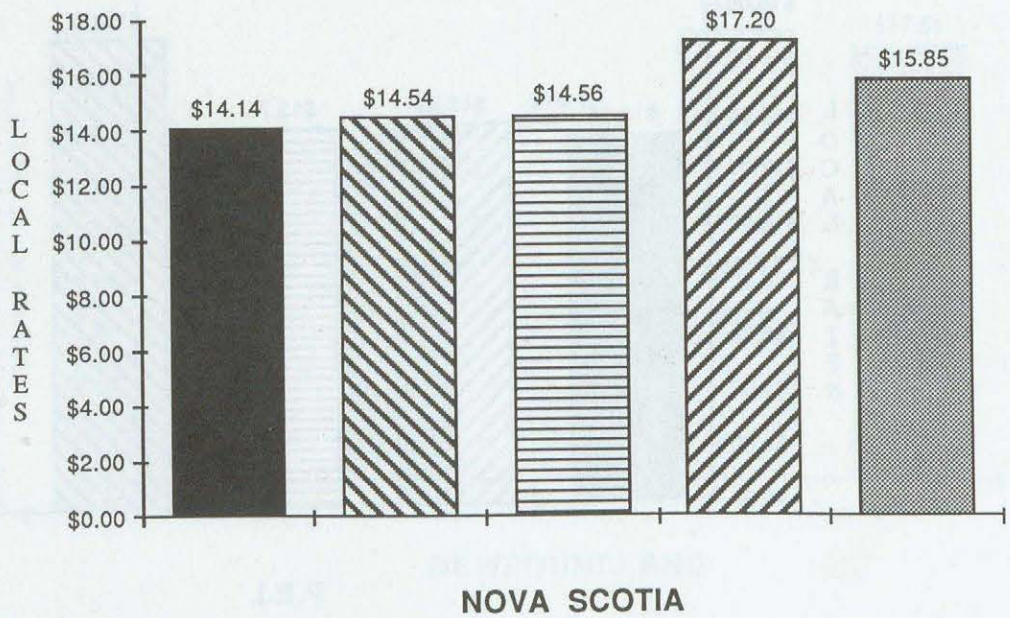


FIGURE 3.20
1990 Residence Local Rates
Assuming Equal Percentage Local Rate Increase

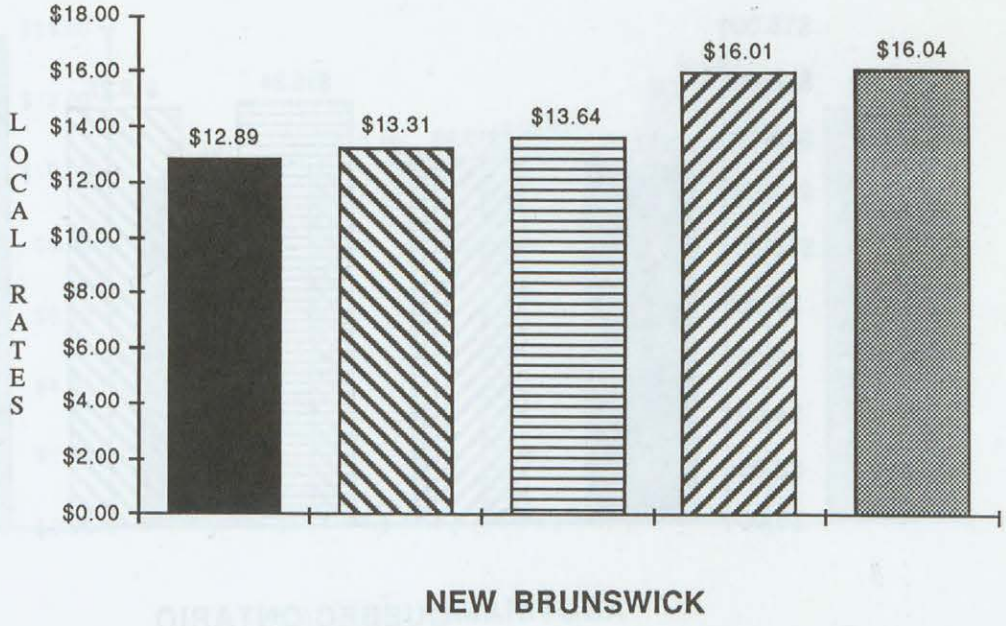


FIGURE 3.21
1990 Residence Local Rates
Assuming Equal Percentage Local Rate Increase

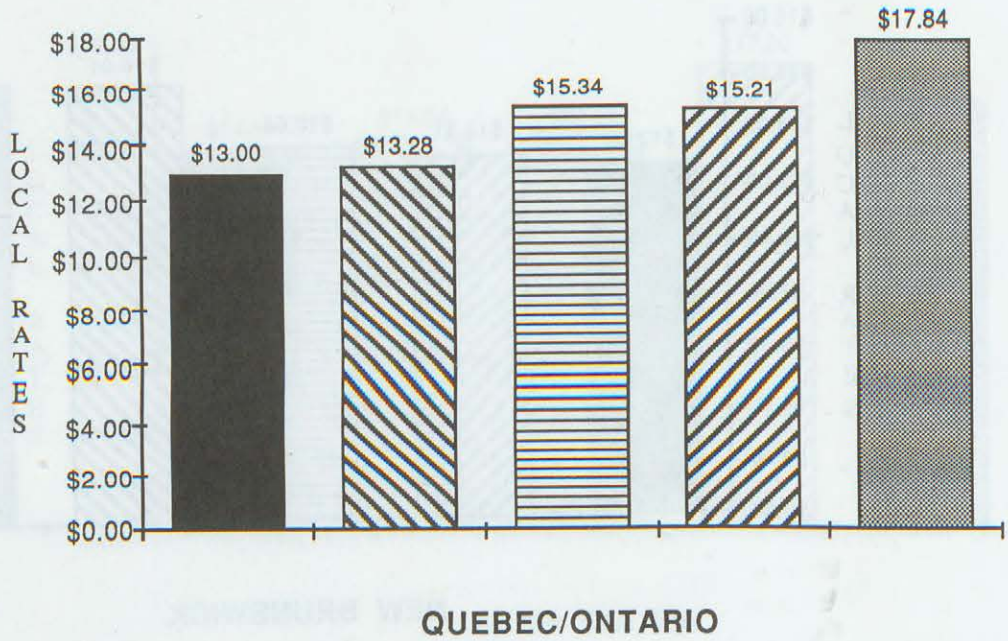
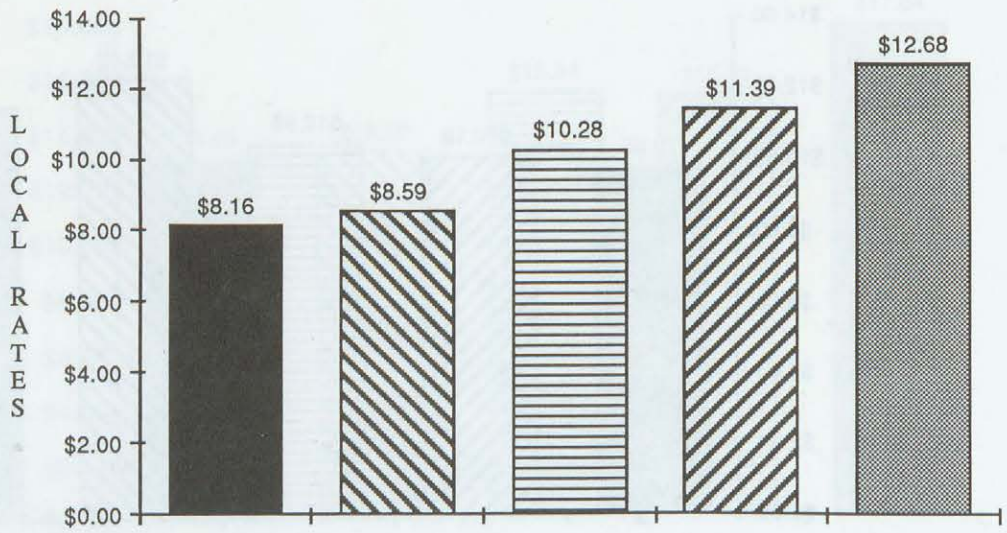


FIGURE 3.22
1990 Residence Local Rates
Assuming Equal Percentage Local Rate Increase

FIGURE 3.23
1990 Residence Local Rates
Assuming Equal Percentage Local Rate Increase



SASKATCHEWAN

Base

With Freeze on L.D. Rates

* inter - provincial only

* inter- and intra - provincial

With Freeze on L.D. Contribution

* inter-provincial only

* inter- and intra - provincial

FIGURE 3.24
1990 Residence Local Rates
Assuming Equal Percentage Local Rate Increase

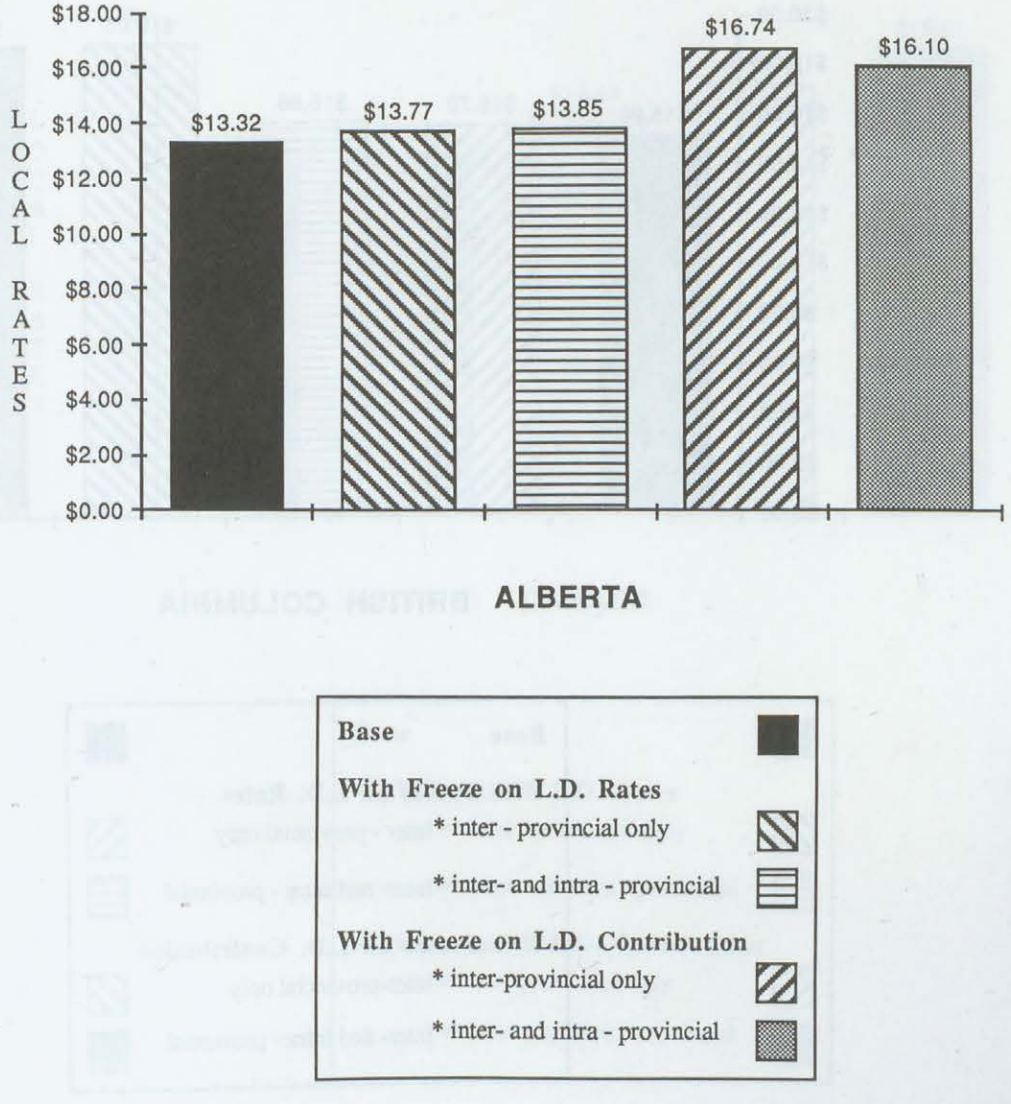


FIGURE 3.25
1990 Residence Local Rates
Assuming Equal Percentage Local Rate Increase

FIGURE 3.26
1990 Residence Local Rates
Assuming Equal Percentage Local Rate Increase

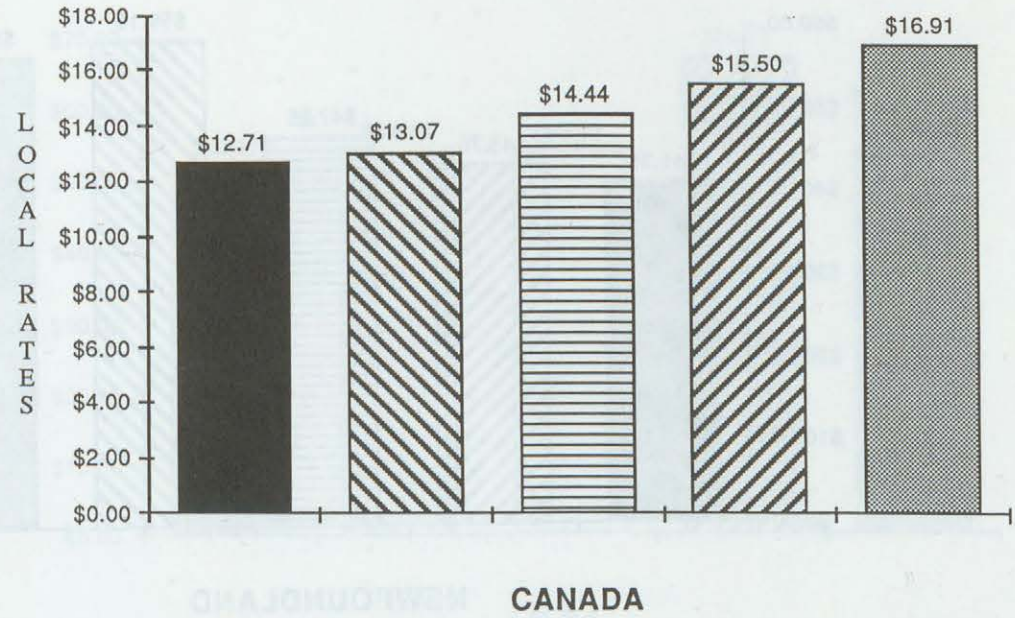


FIGURE 3.27
1990 Business Local Rates
Assuming Equal Percentage Local Rate Increase

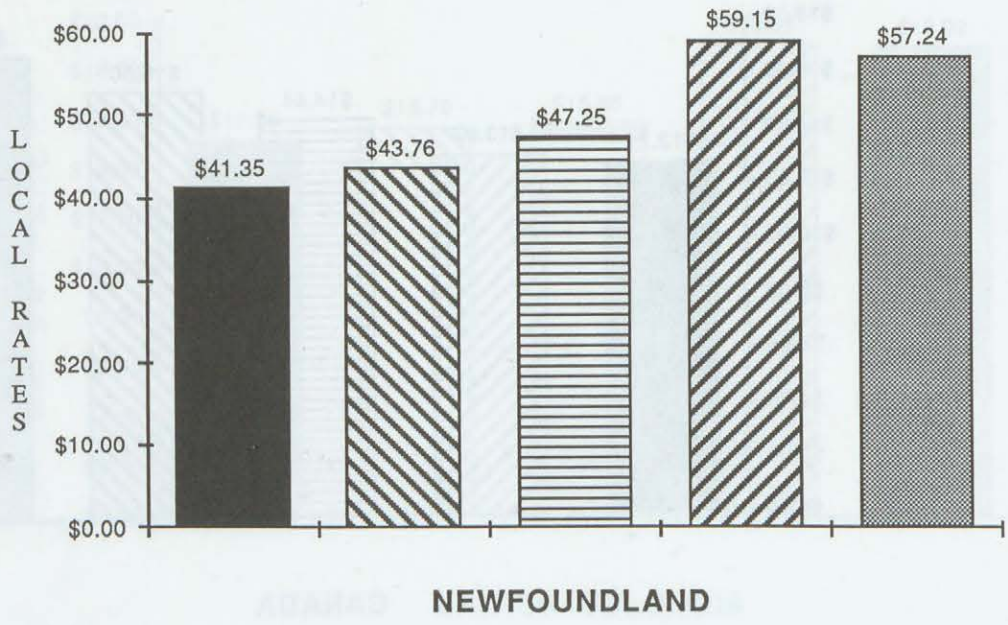


FIGURE 3.28
1990 Business Local Rates
Assuming Equal Percentage Local Rate Increase

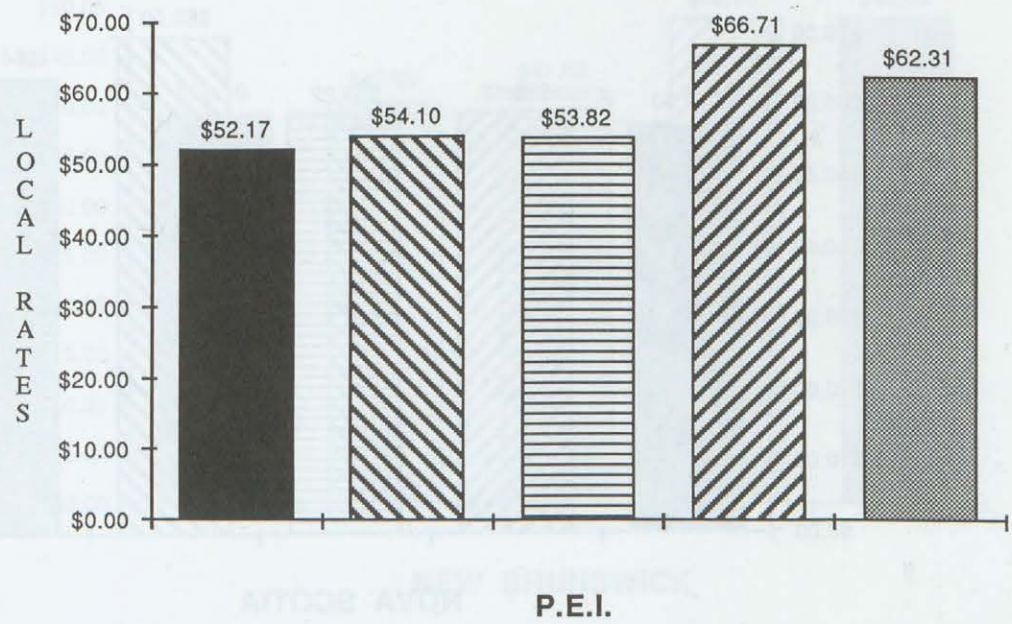


FIGURE 3.29
1990 Business Local Rates
Assuming Equal Percentage Local Rate Increase

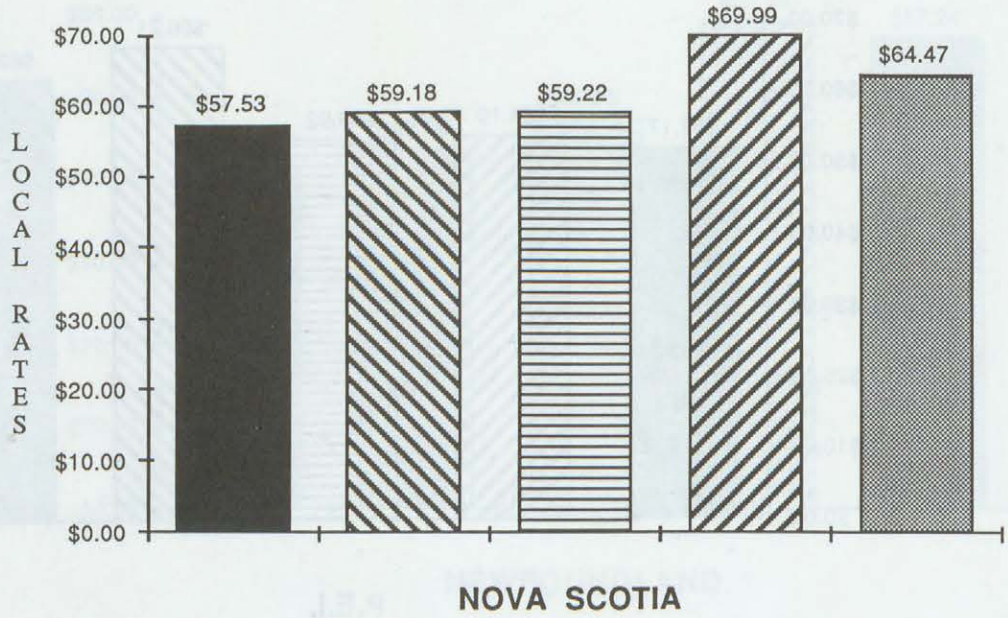


FIGURE 3.30
1990 Business Local Rates
Assuming Equal Percentage Local Rate Increase

FIGURE 3.31
1990 Business Local Rates
Assuming Equal Percentage Local Rate Increase

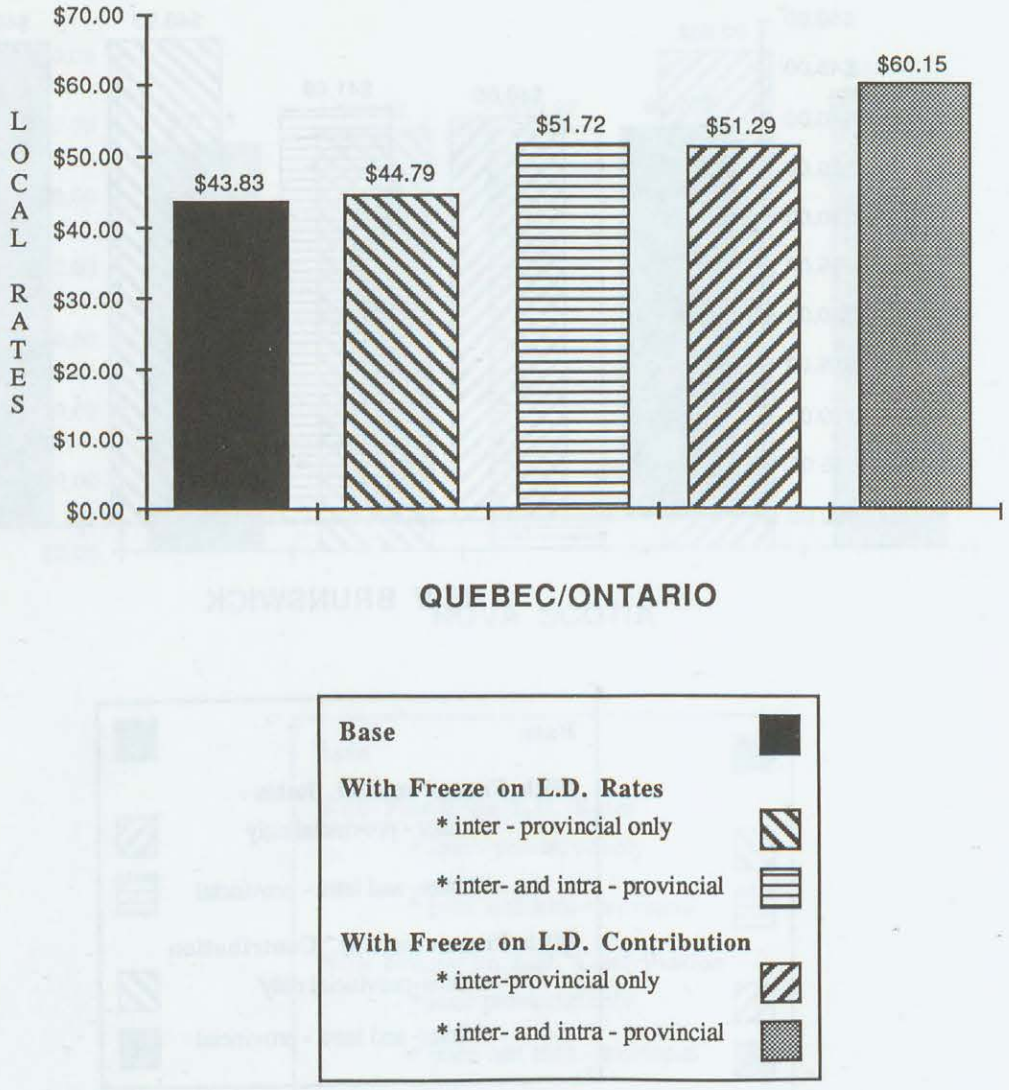


FIGURE 3.32
1990 Business Local Rates
Assuming Equal Percentage Local Rate Increase

FIGURE 3.33
1990 Business Local Rates
Assuming Equal Percentage Local Rate Increase

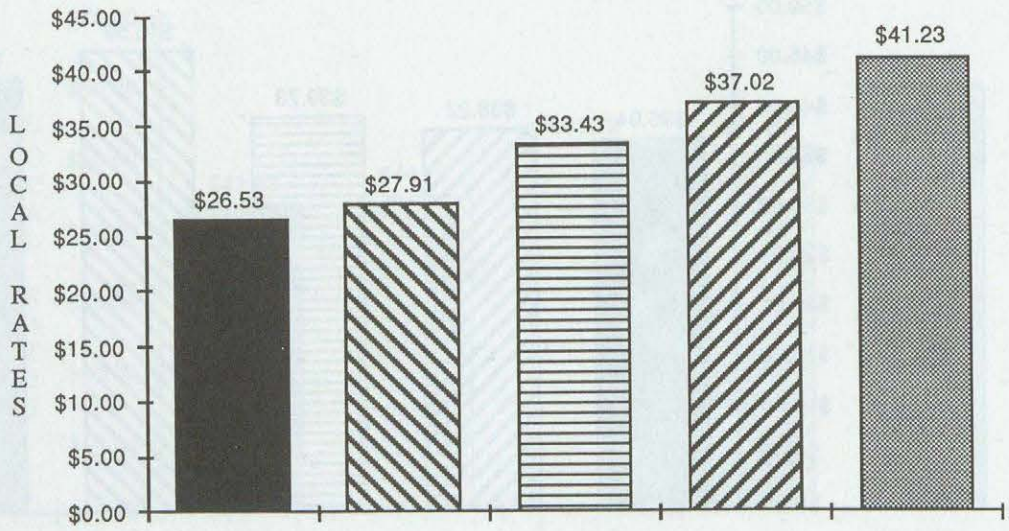


FIGURE 3.34
1990 Business Local Rates
Assuming Equal Percentage Local Rate Increase

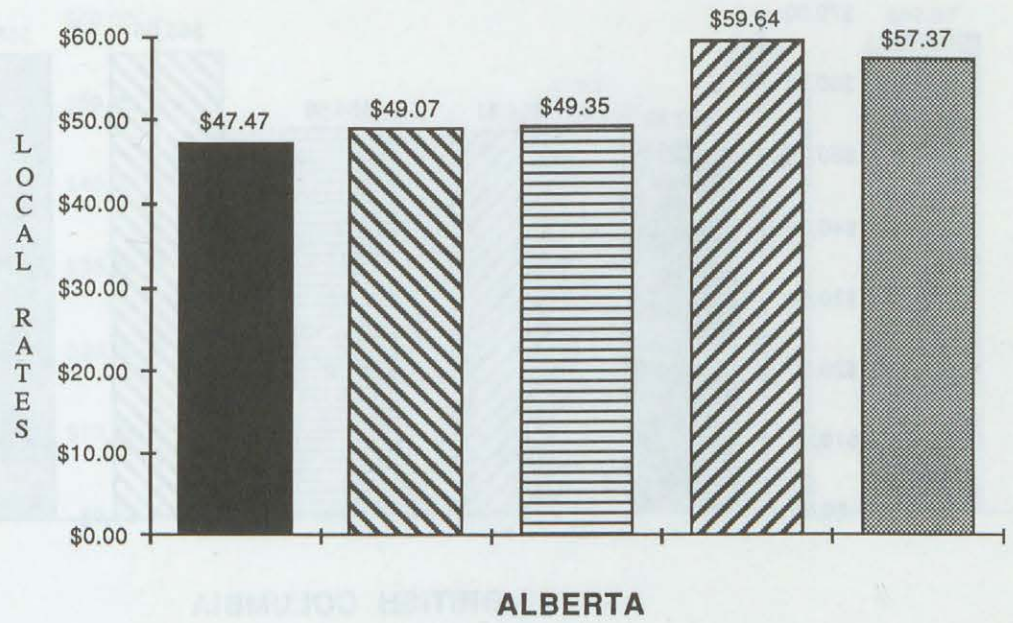
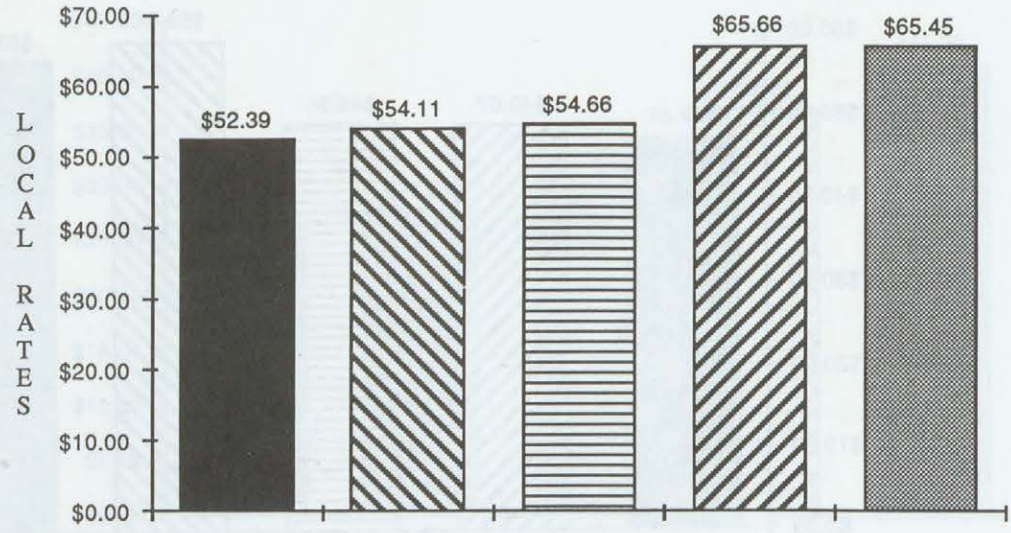


FIGURE 3.35
1990 Business Local Rates
Assuming Equal Percentage Local Rate Increase



BRITISH COLUMBIA

Base

With Freeze on L.D. Rates

* inter - provincial only

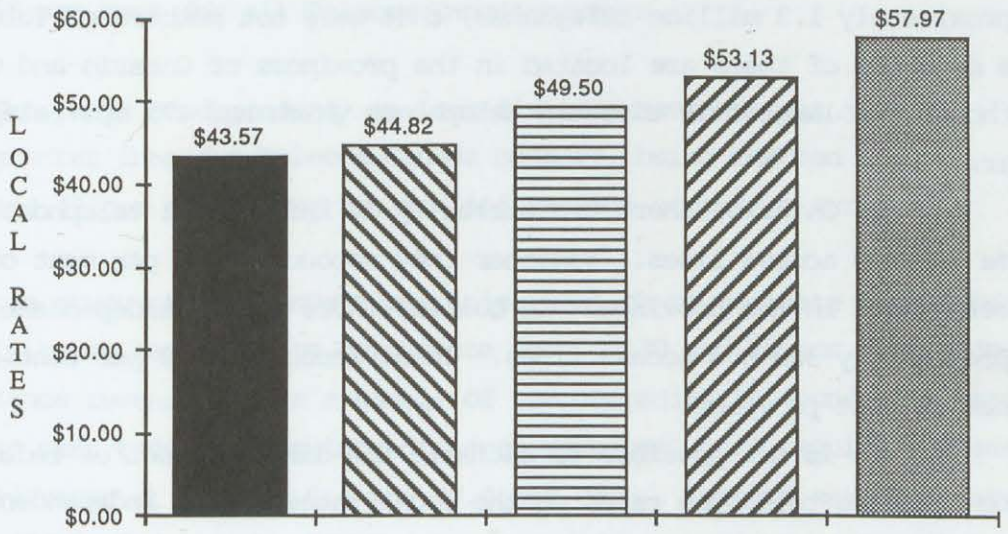
* inter- and intra - provincial

With Freeze on L.D. Contribution

* inter-provincial only

* inter- and intra - provincial

FIGURE 3.36
1990 Business Local Rates
Assuming Equal Percentage Local Rate Increase



3.6 Impact of Long-Distance Rate Reductions on the Independent Telephone Companies

The estimates presented in previous sections of this chapter pertained solely to the nine telephone company members of Telecom Canada. They are the largest telephone companies operating in each of the provinces.

In 1984, however, there were over 100 telephone systems (with approximately 1.3 million telephones) that were not members of Telecom Canada. The majority of these are located in the provinces of Ontario and Quebec, although the largest is edmonton telephones which had 475 000 telephones in that year.

In Ontario, there are currently 30 independent telephone companies with some 280 000 access lines. Together they account for 4 per cent of the telephone access lines in the province. In Quebec, there are 16 independent companies with approximately 380 000 access lines. These account for 9 per cent of the access lines in that province.

It is not possible to estimate the direct impact of reductions in long-distance telephone rates on the local rates of the independent telephone companies with the degree of accuracy attainable for members of Telecom Canada. Nevertheless, it is important that the independent companies and their subscribers be considered in this examination. Any pricing decisions that could be made with respect to Telecom Canada members could also have a significant impact on the independent telephone companies.

Three factors would determine the overall impact of long-distance rate reductions on the local rates of the independent telephone companies:

- the extent of the rate reductions and whether they were confined to Telcom Canada members or extended to the independent companies;

- the proportion of independent company revenues accounted for by long-distance revenues; and

- the terms of independent company revenue settlements with Telecom Canada members and the related likelihood of renegotiation of such settlements.

A 1984 study by D.A. Ford[2] for the province of Ontario provides benchmark estimates of the impact of lower long-distance rates on independent companies in that province. It also establishes a couple of salient facts that facilitate comparison of the detailed estimates for Telecom Canada members and the independent companies:

1. The average percentage of long-distance revenues for ten Ontario companies surveyed was 60 per cent, compared with 58 per cent for all Telecom Canada members.

2. The range of dependency on long-distance revenues was much greater than for Telecom Canada members, being between 31 and 79 per cent among the ten independent companies surveyed.

This study of independent companies went on to estimate the increase in local monthly rates necessary to compensate for 10, 30 and 50 per cent reductions in long-distance revenues. For a sample of ten companies it found, for example, that a 10 per cent reduction in long-distance revenues would require increases in fixed monthly rates of between 6.6 and 27.4 per cent. Further estimates are contained in Table 3.4.

TABLE 3.4
1983 Monthly Local Rate Changes

	1983 Base Monthly Local Rate	Long-Distance Revenue Reductions of					
		10%	30%	50%	10%	30%	50%
		% Increase			New Local Rate		
Company A	$15.42	13.7	41.2	68.7	$17.54	$21.78	$26.01
Company B	$11.38	18.7	56.2	93.7	$13.52	$17.78	$22.05
Company C	$ 6.90	26.9	80.7	134.6	$ 8.76	$12.47	$16.18
Company D	$ 6.96	25.6	76.8	128.1	$ 8.74	$12.31	$15.88
Company E	$ 8.98	21.6	64.7	107.8	$10.92	$14.79	$18.67
Company F	$ 8.43	27.4	82.2	137.0	$10.75	$15.37	$19.99
Company G	$21.33	7.3	21.8	36.3	$22.88	$25.98	$29.07
Company H	$ 9.90	23.0	69.0	114.9	$12.17	$16.72	$21.27
Company I	$11.66	6.6	19.9	33.2	$12.43	$13.98	$15.53

It should be noted that these estimates were calculated based on the simplifying assumption that no traffic stimulation would be generated by long-distance rate reductions. They therefore provide only a very general indication of expected impacts.

The Peat Marwick estimates already discussed incorporate estimates of traffic stimulation and associated expense and investment requirements. They would thus tend to be more accurate than the D.A. Ford study for predicting the impact of long-distance rate reductions. In fact, the similarity between the independent telephone companies and Telecom Canada members with respect to long-distance revenue dependency suggests that the Peat Marwick estimates would be reasonably indicative of the impacts on the independent companies as well -- at least in Ontario. Wide variations among the independent companies' long-distance dependency, however, suggests that these impacts would be quite unevenly distributed. In addition, the extent of the impact of rate reductions would depend on the conditions incorporated in specific revenue settlement agreements.

In Ontario, for instance, independent company subscribers generally pay the same long-distance rates as those paid by Bell Canada subscribers. Consequently, a reduction in long-distance rates would have a direct impact on the traffic agreement revenues to be settled and on subscriber bills. There is also a possibility that commissions paid on traffic might be brought up for renegotiation should Bell Canada experience sustained long-distance revenue losses.

In Quebec, the effect of long-distance rate reductions likely would be somewhat different, because in that province regulatory practice has established that independent telephone companies may charge rates different from those of Bell Canada, with the maximum revenue related to higher rate levels going to the independent company. Consequently, lower long-distance rates for Bell Canada subscribers might result in a smaller reduction in revenues for the independent companies in Quebec than would be the case in Ontario.

3.7 Possible Changes to Rate Structures

The previous sections have discussed estimates as to how the level of local rates could be affected by changes to the level of long-distance rates. While it was necessary to make some assumptions regarding possible divisions of

any local rate increases between residence and business services, the discussion was couched in terms of "average" rate levels and did not consider extensively the possible implications of changing the structure of local rates. Nor were possible changes to the structure of long-distance rates examined.

In considering the impact of rate changes on particular subscriber groups, changes to the rate structure can have effects of a magnitude comparable to that associated with changes in rate levels. Furthermore, if changes to rate structures are made at the same time as changes in rate levels, the two sets of changes may have offsetting or, alternatively, compounding effects.

For instance, to the extent that increased average local rate levels were accompanied by reduced differentials between business and residence rates and a reduction in rate differences among rate groups, residence customers in rural areas would experience above-average local rate impacts. Similarly, to the extent that any reduction in average long-distance rates were accompanied by a restructuring of these rates such that the reductions were greater for long-haul than for short-haul traffic, this would imply above average reductions for those primarily making long-haul calls, and below average reductions for those primarily making short-haul calls. Finally, the implementation of local measured service would lead to low-volume local users experiencing below average local rate increases and high-volume local users experiencing above average rate increases.*

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* Chapter 10 contains a more detailed discussion of alternative local rate structures.

CHAPTER 3

ENDNOTES

1. Peat, Marwick and Partners, "Impacts of Competition in Message Toll Telephone Services." Report commissioned by the Department of Communications and provincial governments, September 1984.

2. D.A. Ford and Associates Ltd., "The Likely Effects of Competition on the Independent Telephone Companies in Ontario." Report prepared for the Government of the Province of Ontario, July 1984.

CHAPTER 3

APPENDIX

TABLES A.1 - A.10: 1986 monthly rate changes

TABLES B.1 - B.8 : 1990 monthly rate changes

Table A.1
1986 Monthly Residence Local Rate Changes -- Assuming Equal Dollar Local Rate increase to Business & Residence Subscribers

	1986 Base Monthly Rate	Inter-provincial Long-Distance Rate Reductions Of								
		10%	30%	50%	10%	30%	50%	10%	30%	50%
		% Increase			$ Increase			New Local Rate		
Newfoundland	$10.93	14.00	53.89	109.24	$1.53	$5.89	$11.94	$12.46	$16.82	$22.87
P.E.I.	$9.88	10.73	44.23	91.60	$1.06	$4.37	$9.05	$10.94	$14.25	$18.93
Nova Scotia	$10.43	9.20	36.43	76.32	$0.96	$3.80	$7.96	$11.39	$14.23	$18.39
New Brunswick	$10.28	10.51	39.20	80.74	$1.08	$4.03	$8.30	$11.36	$14.31	$18.58
Que./Ont.	$10.96	5.02	19.71	42.43	$0.55	$2.16	$4.65	$11.51	$13.12	$15.61
Manitoba	$7.25	12.83	47.59	98.21	$0.93	$3.45	$7.12	$8.18	$10.70	$14.37
Saskatchewan	$6.53	16.23	61.87	129.71	$1.06	$4.04	$8.47	$7.59	$10.57	$15.00
Alberta	$8.46	14.07	54.26	113.95	$1.19	$4.59	$9.64	$9.65	$13.05	$18.10
British Columbia	$10.63	9.97	37.72	79.68	$1.06	$4.01	$8.47	$11.69	$14.64	$19.10
Canada	$10.07	7.55	29.20	61.77	$0.76	$2.94	$6.22	$10.83	$13.01	$16.29

Table A.2
1986 Monthly Business Local Rate Changes -- Assuming Equal Dollar Local Rate Increase to Business & Residence Subscribers

	1986 Base Monthly Rate	Inter-provincial Long-Distance Rate Reductions Of								
		10%	30%	50%	10%	30%	50%	10%	30%	50%
		% Increase			$ Increase			New Local Rate		
Newfoundland	$35.74	4.28	16.48	33.41	$1.53	$5.89	$11.94	$37.27	$41.63	$47.68
P.E.I.	$38.65	2.74	11.31	23.42	$1.06	$4.37	$9.05	$39.71	$43.02	$47.70
Nova Scotia	$42.45	2.26	8.95	18.75	$0.96	$3.80	$7.96	$43.41	$46.25	$50.41
New Brunswick	$31.41	3.44	12.83	26.42	$1.08	$4.03	$8.30	$32.49	$35.44	$39.71
Que./Ont.	$36.97	1.49	5.84	12.58	$0.55	$2.16	$4.65	$37.52	$39.13	$41.62
Manitoba	$27.20	3.42	12.68	26.18	$0.93	$3.45	$7.12	$28.13	$30.65	$34.32
Saskatchewan	$21.24	4.99	19.02	39.88	$1.06	$4.04	$8.47	$22.30	$25.28	$29.71
Alberta	$30.15	3.95	15.22	31.97	$1.19	$4.59	$9.64	$31.34	$34.74	$39.79
British Columbia	$36.64	2.89	10.94	23.12	$1.06	$4.01	$8.47	$37.70	$40.65	$45.11
Canada	$34.52	2.20	8.52	18.02	$0.76	$2.94	$6.22	$35.28	$37.46	$40.74

Table A.3
1986 Monthly Residence Local Rate Changes -- Assuming Equal Percentage
Local Rate Increase to Business & Residence Subscribers

	1986 Base Monthly Rate	Inter-provincial Long-Distance Rate Reductions Of								
		10%	30%	50%	10%	30%	50%	10%	30%	50%
		% Increase			$ Increase			New Local Rate		
Newfoundland	$10.93	9.94	37.69	76.65	$1.09	$4.12	$8.38	$12.02	$15.05	$19.31
P.E.I.	$9.88	7.42	28.78	59.82	$0.73	$2.84	$5.91	$10.61	$12.72	$15.79
Nova Scotia	$10.43	5.77	22.75	47.55	$0.60	$2.37	$4.96	$11.03	$12.80	$15.39
New Brunswick	$10.28	6.71	25.28	52.17	$0.69	$2.60	$5.36	$10.97	$12.88	$15.64
Que./Ont.	$10.96	3.37	13.31	28.65	$0.37	$1.46	$3.14	$11.33	$12.42	$14.10
Manitoba	$7.25	7.62	28.42	58.68	$0.55	$2.06	$4.25	$7.80	$9.31	$11.50
Saskatchewan	$6.53	10.24	39.06	81.77	$0.67	$2.55	$5.34	$7.20	$9.08	$11.87
Alberta	$8.46	8.16	31.54	66.21	$0.69	$2.67	$5.60	$9.15	$11.13	$14.06
British Columbia	$10.63	6.73	25.53	53.85	$0.72	$2.71	$5.72	$11.35	$13.34	$16.35
Canada	$10.07	5.02	19.46	41.23	$0.51	$1.96	$4.15	$10.58	$12.03	$14.22

Table A.4
1986 Monthly Business Local Rate Changes -- Assuming Equal Percentage
Local Rate Increase to Business & Residence Subscribers

	1986 Base Monthly Rate	Inter-provincial Long-Distance Rate Reductions Of								
		10%	30%	50%	10%	30%	50%	10%	30%	50%
		% Increase			$ Increase			New Local Rate		
Newfoundland	$35.74	9.94	37.69	76.65	$3.55	$13.47	$27.39	$39.29	$49.21	$63.13
P.E.I.	$38.65	7.42	28.78	59.82	$2.87	$11.12	$23.12	$41.52	$49.77	$61.77
Nova Scotia	$42.45	5.77	22.75	47.55	$2.45	$9.66	$20.18	$44.90	$52.11	$62.63
New Brunswick	$31.41	6.71	25.28	52.17	$2.11	$7.94	$16.39	$33.52	$39.35	$47.80
Que./Ont.	$36.97	3.37	13.31	28.65	$1.25	$4.92	$10.59	$38.22	$41.89	$47.56
Manitoba	$27.20	7.62	28.42	58.68	$2.07	$7.73	$15.96	$29.27	$34.93	$43.16
Saskatchewan	$21.24	10.24	39.06	81.77	$2.17	$8.30	$17.37	$23.41	$29.54	$38.61
Alberta	$30.15	8.16	31.54	66.21	$2.46	$9.51	$19.96	$32.61	$39.66	$50.11
British Columbia	$36.64	6.73	25.53	53.85	$2.47	$9.35	$19.73	$39.11	$45.99	$56.37
Canada	$34.52	5.02	19.46	41.23	$1.73	$6.72	$14.23	$36.25	$41.24	$48.75

Table A.5
Monthly Residence Local Rate Changes -- Assuming Equal Dollar
Local Rate Increase to Business & Residence Subscribers

	1986 Base Monthly Rate	Inter[intra]-provincial Long-Distance Rate Reductions Of														
		10% [10]	20% [15]	30% [15]	40% [20]	50% [20]	10% [10]	20% [15]	30% [15]	40% [20]	50% [20]	10% [10]	20% [15]	30% [15]	40% [20]	50% [20]
		% Increase					$ Increase					New Local Rate				
Newfoundland	$10.93	28.00	53.89	75.11	109.24	139.25	$3.06	$5.89	$8.21	$11.94	$15.22	$13.99	$16.82	$19.14	$22.87	$26.15
P.E.I.	$9.88	16.80	35.12	53.44	77.83	103.74	$1.66	$3.47	$5.28	$7.69	$10.25	$11.54	$13.35	$15.16	$17.57	$20.13
Nova Scotia	$10.43	19.37	37.30	52.35	76.89	98.47	$2.02	$3.89	$5.46	$8.02	$10.27	$12.45	$14.32	$15.89	$18.45	$20.70
New Brunswick	$10.28	18.68	36.38	52.24	76.75	99.61	$1.92	$3.74	$5.37	$7.89	$10.24	$12.20	$14.02	$15.65	$18.17	$20.52
Que./Ont.	$10.96	15.51	28.19	36.41	53.47	65.97	$1.70	$3.09	$3.99	$5.86	$7.23	$12.66	$14.05	$14.95	$16.82	$18.19
Manitoba	$7.25	21.10	41.66	60.83	89.52	117.38	$1.53	$3.02	$4.41	$6.49	$8.51	$8.78	$10.27	$11.66	$13.74	$15.76
Saskatchewan	$6.53	35.38	66.92	92.19	135.22	172.13	$2.31	$4.37	$6.02	$8.83	$11.24	$8.84	$10.90	$12.55	$15.36	$17.77
Alberta	$8.46	34.99	64.89	87.00	126.95	159.34	$2.96	$5.49	$7.36	$10.74	$13.48	$11.42	$13.95	$15.82	$19.20	$21.94
British Columbia	$10.63	23.80	44.12	59.55	87.39	110.35	$2.53	$4.69	$6.33	$9.29	$11.73	$13.16	$15.32	$16.96	$19.92	$22.36
Canada	$10.07	19.66	36.25	48.26	70.80	88.68	$1.98	$3.65	$4.86	$7.13	$8.93	$12.05	$13.72	$14.93	$17.20	$19.00

Table A.6
Monthly Business Local Rate Changes -- Assuming Equal Dollar
Local Rate Increase to Business & Residence Subscribers

	1986 Base Monthly Rate	Inter[intra]-provincial Long-Distance Rate Reductions Of														
		10% [10]	20% [15]	30% [15]	40% [20]	50% [20]	10% [10]	20% [15]	30% [15]	40% [20]	50% [20]	10% [10]	20% [15]	30% [15]	40% [20]	50% [20]
		% Increase					$ Increase					New Local Rate $				
Newfoundland	$35.74	8.56	16.48	22.97	33.41	42.59	$3.06	$5.89	$8.21	$11.94	$15.22	$38.80	$41.63	$43.95	$47.68	$50.96
P.E.I.	$38.65	4.29	8.98	13.66	19.90	26.52	$1.66	$3.47	$5.28	$7.69	$10.25	$40.31	$42.12	$43.93	$46.34	$48.90
Nova Scotia	$42.45	4.76	9.16	12.86	18.89	24.19	$2.02	$3.89	$5.46	$8.02	$10.27	$44.47	$46.34	$47.91	$50.47	$52.72
New Brunswick	$31.41	6.11	11.91	17.10	25.12	32.60	$1.92	$3.74	$5.37	$7.89	$10.24	$33.33	$35.15	$36.78	$39.30	$41.65
Que./Ont.	$36.97	4.60	8.36	10.79	15.85	19.56	$1.70	$3.09	$3.99	$5.86	$7.23	$38.67	$40.06	$40.96	$42.83	$44.20
Manitoba	$27.20	5.63	11.10	16.21	23.86	31.29	$1.53	$3.02	$4.41	$6.49	$8.51	$28.73	$30.22	$31.61	$33.69	$35.71
Saskatchewan	$21.24	10.88	20.57	28.34	41.57	52.92	$2.31	$4.37	$6.02	$8.83	$11.24	$23.55	$25.61	$27.26	$30.07	$32.48
Alberta	$30.15	9.82	18.21	24.41	35.62	44.71	$2.96	$5.49	$7.36	$10.74	$13.48	$33.11	$35.64	$37.51	$40.89	$43.63
British Columbia	$36.64	6.91	12.80	17.28	25.35	32.01	$2.53	$4.69	$6.33	$9.29	$11.73	$39.17	$41.33	$42.97	$45.93	$48.37
Canada	$34.52	5.74	10.57	14.08	20.65	25.87	$1.98	$3.65	$4.86	$7.13	$8.93	$36.50	$38.17	$39.38	$41.65	$43.45

Table A.7
Monthly Residence Local Rate Changes -- Assuming Equal Percentage
Local Rate Increase to Business & Residence Subscribers

	1986 Base Monthly Rate	Inter[intra]-provincial Long-Distance Rate Reductions Of														
		10% [10]	20% [15]	30% [15]	40% [20]	50% [20]	10% [10]	20% [15]	30% [15]	40% [20]	50% [20]	10% [10]	20% [15]	30% [15]	40% [20]	50% [20]
		% Increase					$ Increase					New Local Rate				
Newfoundland	$10.93	19.48	37.54	52.66	76.49	97.53	$2.13	$4.10	$5.76	$8.36	$10.66	$13.06	$15.03	$16.69	$19.29	$21.59
P.E.I.	$9.88	11.23	23.04	34.87	51.54	68.54	$1.11	$2.28	$3.45	$5.09	$6.77	$10.99	$12.16	$13.33	$14.97	$16.65
Nova Scotia	$10.43	12.06	23.29	32.66	47.92	61.45	$1.26	$2.43	$3.41	$5.00	$6.41	$11.69	$12.86	$13.84	$15.43	$16.84
New Brunswick	$10.28	12.07	23.56	33.81	49.58	64.26	$1.24	$2.42	$3.48	$5.10	$6.61	$11.52	$12.70	$13.76	$15.38	$16.89
Que./Ont.	$10.96	10.49	19.04	24.60	36.09	44.53	$1.15	$2.09	$2.70	$3.96	$4.88	$12.11	$13.05	$13.66	$14.92	$15.84
Manitoba	$7.25	12.61	24.89	36.41	53.50	70.11	$0.91	$1.80	$2.64	$3.88	$5.08	$8.16	$9.05	$9.89	$11.13	$12.33
Saskatchewan	$6.53	22.38	42.24	58.15	85.19	108.46	$1.46	$2.76	$3.80	$5.56	$7.08	$7.99	$9.29	$10.33	$12.09	$13.61
Alberta	$8.46	20.34	37.72	50.58	73.83	92.63	$1.72	$3.19	$4.28	$6.25	$7.84	$10.18	$11.65	$12.74	$14.71	$16.30
British Columbia	$10.63	16.04	29.81	40.26	59.05	74.59	$1.71	$3.17	$4.28	$6.28	$7.93	$12.34	$13.80	$14.91	$16.91	$18.56
Canada	$10.07	13.08	24.19	32.21	47.21	59.13	$1.32	$2.44	$3.24	$4.75	$5.95	$11.39	$12.51	$13.31	$14.82	$16.02

Table A.8
Monthly Business Local Rate Changes -- Assuming Equal Percentage
Local Rate Increase to Business & Residence Subscribers

	1986 Base Monthly Rate	Inter[intra]-provincial Long-Distance Rate Reductions Of														
		10% [10]	20% [15]	30% [15]	40% [20]	50% [20]	10% [10]	20% [15]	30% [15]	40% [20]	50% [20]	10% [10]	20% [15]	30% [15]	40% [20]	50% [20]
		% Increase					$ Increase					New Local Rate				
Newfoundland	$35.74	19.48	37.54	52.66	76.49	97.53	$6.96	$13.42	$18.82	$27.34	$34.86	$42.70	$49.16	$54.56	$63.08	$70.60
P.E.I.	$38.65	11.23	23.04	34.87	51.54	68.54	$4.34	$8.90	$13.48	$19.92	$26.49	$42.99	$47.55	$52.13	$58.57	$65.14
Nova Scotia	$42.45	12.06	23.29	32.66	47.92	61.45	$5.12	$9.89	$13.86	$20.34	$26.09	$47.57	$52.34	$56.31	$62.79	$68.54
New Brunswick	$31.41	12.07	23.56	33.81	49.58	64.26	$3.79	$7.40	$10.62	$15.57	$20.18	$35.20	$38.81	$42.03	$46.98	$51.59
Que./Ont.	$36.97	10.49	19.04	24.60	36.09	44.53	$3.88	$7.04	$9.09	$13.34	$16.46	$40.85	$44.01	$46.06	$50.31	$53.43
Manitoba	$27.20	12.61	24.89	36.41	53.50	70.11	$3.43	$6.77	$9.90	$14.55	$19.07	$30.63	$33.97	$37.10	$41.75	$46.27
Saskatchewan	$21.24	22.38	42.24	58.15	85.19	108.46	$4.75	$8.97	$12.35	$18.09	$23.04	$25.99	$30.21	$33.59	$39.33	$44.28
Alberta	$30.15	20.34	37.72	50.58	73.83	92.63	$6.13	$11.37	$15.25	$22.26	$27.93	$36.28	$41.52	$45.40	$52.41	$58.08
British Columbia	$36.64	16.04	29.81	40.26	59.05	74.59	$5.88	$10.92	$14.75	$21.64	$27.33	$42.52	$47.56	$51.39	$58.28	$63.97
Canada	$34.52	13.08	24.19	32.21	47.21	59.13	$4.52	$8.35	$11.12	$16.30	$20.41	$39.04	$42.87	$45.64	$50.82	$54.93

Table A.9
1986 Monthly Residence Local Rate Levels -- Assuming Equal Percentage Local Rate increase to Business & Residence Subscribers
(Price Elasticities of -0.4, -0.8 and -1.3)

	1986 Base Monthly Rate	Inter-provincial Long-Distance Rate Reductions Of						
		30%	50%	10%	30%	50%	30%	50%
		Elasticity -0.4		Elasticity -0.8			Elasticity -1.3	
Newfoundland	$10.93	$16.29	$20.65	$12.02	$15.05	$19.31	$13.29	$17.22
P.E.I.	$9.88	$13.53	$16.55	$10.61	$12.72	$15.79	$11.58	$14.58
Nova Scotia	$10.43	$13.61	$16.25	$11.03	$12.80	$15.39	$11.65	$14.01
New Brunswick	$10.28	$13.73	$16.55	$10.97	$12.88	$15.64	$11.66	$14.19
Que./Ont.	$10.96	$13.04	$14.80	$11.33	$12.42	$14.10	$11.51	$12.96
Manitoba	$7.25	$10.06	$12.35	$7.80	$9.31	$11.50	$8.24	$10.17
Saskatchewan	$6.53	$10.01	$12.89	$7.20	$9.08	$11.87	$7.74	$10.24
Alberta	$8.46	$12.14	$15.18	$9.15	$11.13	$14.06	$9.68	$12.28
British Columbia	$10.63	$14.40	$17.52	$11.35	$13.34	$16.35	$11.81	$14.48
Canada	$10.07	$12.80	$15.08	$10.58	$12.03	$14.22	$10.91	$12.84

Table A.10
1986 Monthly Residence Local Rate Increases -- Assuming Equal Percentage Local Rate increase to Business & Residence Subscribers
(Price Elasticities of -0.4, -0.8 and -1.3)

	1986 Base Monthly Rate	Inter-provincial Long-Distance Rate Reductions Of						
		30%	50%	10%	30%	50%	30%	50%
		Elasticity -0.4 (% Increase)		Elasticity -0.8 (% Increase)			Elasticity -1.3 (% Increase)	
Newfoundland	$10.93	49.04	88.93	9.97	37.69	76.67	21.59	57.55
P.E.I.	$9.88	36.94	67.51	7.38	28.74	59.82	17.21	47.57
Nova Scotia	$10.43	30.49	55.80	5.75	22.72	47.56	11.69	34.32
New Brunswick	$10.28	33.56	60.99	6.71	25.29	52.14	13.42	38.04
Que./Ont.	$10.96	18.98	35.04	3.37	13.32	28.65	5.02	18.25
Manitoba	$7.25	38.76	70.34	7.59	28.41	58.62	13.66	40.28
Saskatchewan	$6.53	53.29	97.40	10.26	39.05	81.77	18.53	56.81
Alberta	$8.46	43.50	79.43	8.16	31.56	66.19	14.42	45.15
British Columbia	$10.63	35.47	64.82	6.77	25.49	53.80	11.10	36.22
Canada	$10.07	27.11	49.75	5.06	19.46	41.21	8.34	27.51

Table B.1
1990 Monthly Residence Local Rate Changes -- Assuming Equal Dollar Local Rate Increase to Business & Residence Subscribers

	Base Monthly Rate		CONTRIBUTIONS FREEZE					
			Inter-provincial only			Inter- & intra-provincial		
	1986	1990	% Incr.	$ Incr.	1990 New Local Rate	% Incr.	$ Incr.	1990 New Local Rate
Newfoundland	$10.93	$13.39	57.80	$7.74	$21.13	51.83	$6.94	$20.33
P.E.I.	$9.88	$15.18	37.29	$5.66	$20.84	25.96	$3.94	$19.12
Nova Scotia	$10.43	$16.37	30.05	$4.92	$21.29	16.80	$2.75	$19.12
New Brunswick	$10.28	$14.32	33.87	$4.85	$19.17	34.22	$4.90	$19.22
Que./Ont.	$10.96	$13.96	23.42	$3.27	$17.23	51.29	$7.16	$21.12
Manitoba	$7.25	$11.59	37.01	$4.29	$15.88	27.26	$3.16	$14.75
Saskatchewan	$6.53	$9.11	56.09	$5.11	$14.22	78.59	$7.16	$16.27
Alberta	$8.46	$16.86	34.88	$5.88	$22.74	28.35	$4.78	$21.64
British Columbia	$10.63	$16.99	33.43	$5.68	$22.67	32.96	$5.60	$22.59
Canada	$10.07	$14.09	29.52	$4.16	$18.25	44.43	$6.26	$20.35

Table B.2
1990 Monthly Business Local Rate Changes -- Assuming Equal Dollar Local Rate Increase to Business & Residence Subscribers

	Base Monthly Rate		CONTRIBUTIONS FREEZE					
			Inter-provincial only			Inter- & Intra-provincial		
	1986	1990	% Incr.	$ Incr.	1990 New Local Rate	% Incr.	$ Incr.	1990 New Local Rate
Newfoundland	$35.74	$38.20	20.26	$7.74	$45.94	18.17	$6.94	$45.14
P.E.I.	$38.65	$43.95	12.88	$5.66	$49.61	8.96	$3.94	$47.89
Nova Scotia	$42.45	$48.39	10.17	$4.92	$53.31	5.68	$2.75	$51.14
New Brunswick	$31.41	$35.45	13.68	$4.85	$40.30	13.82	$4.90	$40.35
Que./Ont.	$36.97	$39.97	8.18	$3.27	$43.24	17.91	$7.16	$47.13
Manitoba	$27.20	$31.54	13.60	$4.29	$35.83	10.02	$3.16	$34.70
Saskatchewan	$21.24	$23.82	21.45	$5.11	$28.93	30.06	$7.16	$30.98
Alberta	$30.15	$38.55	15.25	$5.88	$44.43	12.40	$4.78	$43.33
British Columbia	$36.64	$43.00	13.21	$5.68	$48.68	13.02	$5.60	$48.60
Canada	$34.52	$38.54	10.79	$4.16	$42.70	16.24	$6.26	$44.80

Table B.3
1990 Monthly Residence Local Rate Changes -- Assuming Equal Percentage
Local Rate Increase to Business & Residence Subscribers

	Base Monthly Rate		CONTRIBUTIONS FREEZE					
			Inter-provincial only			Inter- & intra-provincial		
	1986	1990	% Incr.	$ Incr.	1990 New Local Rate	% Incr.	$ Incr.	1990 New Local Rate
Newfoundland	$10.93	$12.65	43.05	$5.45	$18.10	38.42	$4.86	$17.51
P.E.I.	$9.88	$13.34	27.87	$3.72	$17.06	19.44	$2.59	$15.93
Nova Scotia	$10.43	$14.14	21.65	$3.06	$17.20	12.07	$1.71	$15.85
New Brunswick	$10.28	$12.89	24.22	$3.12	$16.01	24.47	$3.15	$16.04
Que./Ont.	$10.96	$13.00	17.02	$2.21	$15.21	37.23	$4.84	$17.84
Manitoba	$7.25	$9.85	26.11	$2.57	$12.42	19.21	$1.89	$11.74
Saskatchewan	$6.53	$8.16	39.53	$3.23	$11.39	55.41	$4.52	$12.68
Alberta	$8.46	$13.32	25.64	$3.42	$16.74	20.86	$2.78	$16.10
British Columbia	$10.63	$15.20	25.33	$3.85	$19.05	24.93	$3.79	$18.99
Canada	$10.07	$12.71	21.95	$2.79	$15.50	33.04	$4.20	$16.91

Table B.4
1990 Monthly Business Local Rate Changes -- Assuming Equal Percentage
Local Rate Increase to Business & Residence Subscribers

	Base Monthly Rate		CONTRIBUTIONS FREEZE					
			Inter-provincial only			Inter- & intra-provincial		
	1986	1990	% Incr.	$ Incr.	1990 New Local Rate	% Incr.	$ Incr.	1990 New Local Rate
Newfoundland	$35.74	$41.35	43.05	$17.80	$59.15	38.42	$15.89	$57.24
P.E.I.	$38.65	$52.17	27.87	$14.54	$66.71	19.44	$10.14	$62.31
Nova Scotia	$42.45	$57.53	21.65	$12.46	$69.99	12.07	$6.94	$64.47
New Brunswick	$31.41	$39.39	24.22	$9.54	$48.93	24.47	$9.64	$49.03
Que./Ont.	$36.97	$43.83	17.02	$7.46	$51.29	37.23	$16.32	$60.15
Manitoba	$27.20	$36.94	26.11	$9.65	$46.59	19.21	$7.10	$44.04
Saskatchewan	$21.24	$26.53	39.53	$10.49	$37.02	55.41	$14.70	$41.23
Alberta	$30.15	$47.47	25.64	$12.17	$59.64	20.86	$9.90	$57.37
British Columbia	$36.64	$52.39	25.33	$13.27	$65.66	24.93	$13.06	$65.45
Canada	$34.52	$43.57	21.95	$9.56	$53.13	33.04	$14.40	$57.97

Table B.5
1990 Monthly Residence Local Rate Changes -- Assuming Equal Dollar Local Rate Increase to Business & Residence Subscribers

	Base Monthly Rate		FREEZE on LONG-DISTANCE RATES					
			Inter-provincial only			Inter- & intra-provincial		
	1986	1990	% Incr.	$ Incr.	1990 New Local Rate	% Incr.	$ Incr.	1990 New Local Rate
Newfoundland	$10.93	$13.39	7.92	$1.06	$14.45	19.12	$2.56	$15.95
P.E.I.	$9.88	$15.18	4.87	$0.74	$15.92	4.08	$0.62	$15.80
Nova Scotia	$10.43	$16.37	4.03	$0.66	$17.03	4.15	$0.68	$17.05
New Brunswick	$10.28	$14.32	4.61	$0.66	$14.98	8.24	$1.18	$15.50
Que./Ont.	$10.96	$13.96	3.01	$0.42	$14.38	24.79	$3.46	$17.42
Manitoba	$7.25	$11.59	4.83	$0.56	$12.15	10.61	$1.23	$12.82
Saskatchewan	$6.53	$9.11	7.35	$0.67	$9.78	36.77	$3.35	$12.46
Alberta	$8.46	$16.86	4.57	$0.77	$17.63	5.40	$0.91	$17.77
British Columbia	$10.63	$16.99	4.36	$0.74	$17.73	5.77	$0.98	$17.97
Canada	$10.07	$14.09	3.83	$0.54	$14.63	18.31	$2.58	$16.67

Table B.6
1990 Monthly Business Local Rate Changes -- Assuming Equal Dollar Local Rate Increase to Business & Residence Subscribers

	Base Monthly Rate		FREEZE on LONG-DISTANCE RATES					
			Inter-provincial only			Inter- & intra-provincial		
	1986	1990	% Incr.	$ Incr.	1990 New Local Rate	% Incr.	$ Incr.	1990 New Local Rate
Newfoundland	$35.74	$38.20	2.77	$1.06	$39.26	6.70	$2.56	$40.76
P.E.I.	$38.65	$43.95	1.68	$0.74	$44.69	1.41	$0.62	$44.57
Nova Scotia	$42.45	$48.39	1.36	$0.66	$49.05	1.41	$0.68	$49.07
New Brunswick	$31.41	$35.45	1.86	$0.66	$36.11	3.33	$1.18	$36.63
Que./Ont.	$36.97	$39.97	1.05	$0.42	$40.39	8.66	$3.46	$43.43
Manitoba	$27.20	$31.54	1.78	$0.56	$32.10	3.90	$1.23	$32.77
Saskatchewan	$21.24	$23.82	2.81	$0.67	$24.49	14.06	$3.35	$27.17
Alberta	$30.15	$38.55	2.00	$0.77	$39.32	2.36	$0.91	$39.46
British Columbia	$36.64	$43.00	1.72	$0.74	$43.74	2.28	$0.98	$43.98
Canada	$34.52	$38.54	1.40	$0.54	$39.08	6.69	$2.58	$41.12

Table B.7
1990 Monthly Residence Local Rate Changes -- Assuming Equal Percentage Local Rate Increase to Business & Residence Subscribers

	Base Monthly Rate		FREEZE on LONG-DISTANCE RATES					
			Inter-provincial only			Inter- & intra-provincial		
	1986	1990	% Incr.	$ Incr.	1990 New Local Rate	% Incr.	$ Incr.	1990 New Local Rate
Newfoundland	$10.93	$12.65	5.82	$0.74	$13.39	14.28	$1.81	$14.46
P.E.I.	$9.88	$13.34	3.70	$0.49	$13.83	3.16	$0.42	$13.76
Nova Scotia	$10.43	$14.14	2.86	$0.40	$14.54	2.94	$0.42	$14.56
New Brunswick	$10.28	$12.89	3.23	$0.42	$13.31	5.85	$0.75	$13.64
Que./Ont.	$10.96	$13.00	2.19	$0.28	$13.28	18.00	$2.34	$15.34
Manitoba	$7.25	$9.85	3.46	$0.34	$10.19	7.55	$0.74	$10.59
Saskatchewan	$6.53	$8.16	5.21	$0.43	$8.59	26.00	$2.12	$10.28
Alberta	$8.46	$13.32	3.37	$0.45	$13.77	3.95	$0.53	$13.85
British Columbia	$10.63	$15.20	3.28	$0.50	$15.70	4.34	$0.66	$15.86
Canada	$10.07	$12.71	2.86	$0.36	$13.07	13.61	$1.73	$14.44

Table B.8
1990 Monthly Business Local Rate Changes -- Assuming Equal Percentage Local Rate Increase to Business & Residence Subscribers

	Base Monthly Rate		FREEZE on LONG-DISTANCE RATES					
			Inter-provincial only			Inter- & intra-provincial		
	1986	1990	% Incr.	$ Incr.	1990 New Local Rate	% Incr.	$ Incr.	1990 New Local Rate
Newfoundland	$35.74	$41.35	5.82	$2.41	$43.76	14.28	$5.90	$47.25
P.E.I.	$38.65	$52.17	3.70	$1.93	$54.10	3.16	$1.65	$53.82
Nova Scotia	$42.45	$57.53	2.86	$1.65	$59.18	2.94	$1.69	$59.22
New Brunswick	$31.41	$39.39	3.23	$1.27	$40.66	5.85	$2.30	$41.69
Que./Ont.	$36.97	$43.83	2.19	$0.96	$44.79	18.00	$7.89	$51.72
Manitoba	$27.20	$36.94	3.46	$1.28	$38.22	7.55	$2.79	$39.73
Saskatchewan	$21.24	$26.53	5.21	$1.38	$27.91	26.00	$6.90	$33.43
Alberta	$30.15	$47.47	3.37	$1.60	$49.07	3.95	$1.88	$49.35
British Columbia	$36.64	$52.39	3.28	$1.72	$54.11	4.34	$2.27	$54.66
Canada	$34.52	$43.57	2.86	$1.25	$44.82	13.61	$5.93	$49.50

CHAPTER 4

Effects of Current and Alternative Rate Structures on Maintaining Universal Availability of Affordable Telephone Service

CHAPTER 4

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CHAPTER 4

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4.1 Introduction

It is widely recognized that current telephone pricing principles and practices have contributed to the high level of availability of telephone service throughout Canada. For the vast majority of Canadians, access to affordable telephone service is considered to be an integral part of life. Canadians have come to accept telephone service as an essential means to communicate efficiently for business, personal and emergency purposes.

Given the fundamental importance of telephone service to Canadians, there are two central questions related to current and alternative telephone rate levels that will be examined in this paper. First, notwithstanding the current high levels of availability, is telephone service throughout the country sufficiently accessible and affordable? Second, if telecommunications rate levels are changed in the future -- particularly to raise local rates -- what will be the effect on the availability of affordable telephone service?

This paper examines these two issues primarily from the perspective of possible changes to local rates. Section 4.2 presents the policy bases for the universal availability of affordable telephone service (i.e. "universal telephone service"), describes various definitions of universality that have been suggested in Canada and examines conceptual issues surrounding the concept of universal service. Section 4.3 provides evidence regarding telephone service availability across regions and by income and age groups, and examines measurements of the concept of affordability. Section 4.4 examines evidence on the demand for telephone service and provides an estimate of consumer response to alternative local rate structures. Section 4.5 considers other factors in local service provision that could affect universal telephone service. The final section of the chapter examines the impact of current and alternative long-distance rates on universality. It focusses primarily on telephone service in the remote and northern areas of the country where access to affordable long-distance service may be more important than local service.

4.2 Universal Availability of Basic Telephone Service

4.2.1 General Background

In Canada, there are no laws requiring the provision of universal telephone service. In fact, the term "universal service" has never been

precisely defined and is thus subject to various interpretations. However, that universal service is an important policy goal seems undisputed. For example, the federal Minister of Communications declared in a 1985 statement that:

> First and foremost, we must develop a policy which preserves universal access to the telecommunications system at affordable prices.[1]

Similarly, the Ontario Minister of Transportation and Communications has stated that one of the goals of the Government of Ontario in approaching telecommunications policy is "universal access at affordable rates."[2] That priority should be given to "maintaining universal access to affordable telephone service for all Canadian consumers" was also agreed to by federal, provincial and territorial ministers of Communications at the close of a two-day conference in February 1986.[3]

In 1979, provincial and federal Communications ministers accepted a Federal-Provincial Working Group Report which defined basic telecommunication services to be "those which Government deemed to be essential, and which should be universally available."[4] In a 1980 Telecommunication Inquiry, Alberta Government Telephones (AGT) stated that:

> The mandate [of the company is]... the obligation to ensure that basic telecommunication services are available throughout all the province, including not only urban areas but also the wide spread (sic) rural and remote regions which are more costly to serve.[5]

4.2.2 Definitions of Universality

Some of the more contentious issues in defining universality of telephone service relate to determining the minimum level of subscribership, quality of service and the maximum level of rates deemed affordable to consumers. Four definitions of the concept of universal service, as it applies to residential local telephone service, will be discussed in this section.

1. Every household is able to have telephone access on its premises at a price it can afford to pay.*

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* Household is defined as a person or group of persons occupying one dwelling unit. The number of households will therefore be equal to the number of occupied dwellings. Second dwellings are not included in this definition.

According to this conception of universal service, all individuals have a right to telephone service and none should be precluded, because of price, from having on-premises telephone access. By this definition, to achieve universality it would be necessary: (a) to provide service to different households at varying rates, (b) to charge all households the same rates but administer a program of offsetting subsidies, or (c) to provide telephone service at a sufficiently low rate so as to be affordable to 100 per cent of householders. Variations on this definition can also be considered where access is defined as single-party service or where two-or-more party service is also considered acceptable. In the latter case, universality could be achieved by means of a reduced price policy for multi-party service only.

In this regard, it should be noted that in 1979 federal and provincial ministers of Communications accepted a report recommending "access to two-way public-switched telephone service for both local and long-distance calling, with no more than four subscribers per line,"[6] as a minimum acceptable level of service.

The CRTC, in past decisions, has also allowed for alternative service quality in defining universality of telephone service. In Telecom Decision CRTC 81-15, it stated that:

> The Commission believes that basic telephone service should be universally accessible and that service offerings should be available which mitigate the burden caused to those on limited or fixed incomes... the Commission determined that two-party service, with rates set approximately 35% below individual line rates [then in effect], provides an appropriate universally available 'budget' service...[7]

Further variations on this definition could be considered by defining telephone access as providing for only some limited quantity of free local calling. While not currently used in Canada, such limitations are an inherent feature of a number of "budget service" options available in the United States.

2. Every household is able to have telephone access on its premises at prices affordable for the vast majority of users.

As with the first definition, telephone access may be defined in a number of ways with regard to the quality of service provided. This definition

differs from the previous one in that it allows for some exceptions to the general requirement that telephone service be affordable to all. Such exceptions could result from either the prohibitive costs of providing access in some areas or individual economic limitations in some households. Bell Canada, in accordance with this approach, has defined universality in terms of the widespread availability of basic local telephone services.[8]

3. Every household is able to have telephone access, convenient to its premises, at prices affordable for the vast majority of users.

The attainment of this concept of universal service requires telephone companies to provide basic service either at or nearby the premises of every household. Accordingly, service may be reasonably available even though a household does not have on-premise connection to the network. Availability may instead be satisfied through use of a nearby coin telephone, through convenient access to a neighbour's telephone or to a commonly-shared telephone, such as in the hallway of a rooming-house.

4. All households have telephone access in their residence.

That means a telephone in every home. This concept of universal service could only be achieved if people who do not want local telephone service were required to subscribe to it (though perhaps at reduced rates if subsidized by the general subscriber base or otherwise).

4.3. Telephone Availability and Affordability

4.3.1 Measurement of Availability and Affordability

The percentage of households with local telephone service, often called the penetration rate or level, is the most widely used measure of telephone service availability. A penetration level of 100 per cent would indicate that every household has telephone service. While the penetration level indicates the percentage of households that elect to subscribe to telephone service, it does not indicate the extent to which telephone costs affect family budgets for other expenditures.

A more useful measure of telephone affordability is therefore the percentage of disposable income that households spend on telephone service. An increasing trend in this measure would show that telephone service has become less affordable, so that households may have to curtail other expenditures in order to maintain telephone service. A declining trend, on the other hand, would show that it has become more affordable.

Telephone affordability can be further indicated by comparing the increase in telephone rates with the price levels of other consumption goods and services. A faster increase in telephone rates relative to the prices of other consumer goods and services would indicate that it has become less affordable; a slower rate of increase would indicate that it has become more affordable.

4.3.2 Telephone Service Penetration Levels

a) Penetration by geographic area

Table 4.1 presents telephone penetration levels for Canada as a whole and for the individual provinces:

TABLE 4.1
Telephone Penetration Levels, 1970, 1975, 1980 and 1985
(Percentage households with telephone service)

Year	1970	1975	1980	1985
CANADA	94.5	96.4	97.6	98.2
Newfoundland	78.5	90.4	94.4	94.4
Prince Edward Island	84.0	90.0	94.1	95.2
Nova Scotia	86.9	92.8	96.1	96.7
New Brunswick	89.9	95.3	94.4	94.9
Quebec	94.3	96.6	98.0	98.6
Ontario	96.7	97.5	98.0	99.0
Manitoba	95.0	97.1	97.4	97.2
Saskatchewan	90.8	95.2	97.4	97.5
Alberta	94.1	96.3	97.9	98.0
British Columbia	95.9	95.5	97.8	97.7

Source: Statistics Canada Catalogue 64-202.

This table establishes that telephone service penetration levels are high both across Canada and for each of the provinces. Clearly the vast majority of the population in each province appears to find local telephone service both accessible and affordable.

In comparison, the telephone penetration level in the United States was considerably lower — 91.8 per cent in 1985, up from 91.5 per cent in 1980.[9] In a report assessing the effects of its decisions on universal telephone service, the United States Federal Communications Commission (FCC), claiming that the United States has achieved universal service, stated in 1984 that:

> Most participants [to the Access Charge proceeding] apparently agree that 'universal service' has existed on a nationwide basis for several years...a 'universal service objective' means avoiding actions that would cause a significant number of local exchange service subscribers to cancel that service.[10]

Canada, on a nation-wide basis, has done much better than the United States in its pursuit of the goal of universal telephone service. Penetration levels for a number of other countries are given in Appendix A, though it should be noted that these figures are not as reliable as those calculated for Canada or the US and they should be regarded as approximations only.

Within each province, however, there are regions where telephone service penetration levels fall well below the Canadian average. For example, only 79.3 per cent of households located in the northern areas of British Columbia, the Yukon and parts of the Northwest Territories had telephone service in 1981.[11] Similarly, only 53 per cent of the households in the 63 communities situated in the area north of an imaginary line extending across Saskatchewan through Meadow Lake, and north of Prince Albert to Cumberland House had telephone service at that time.[12]

Table 4.2 shows telephone penetration by urban/rural split and by geographic region. In general, penetration levels are lower in the Atlantic provinces than in other parts of the country.

TABLE 4.2
Telephone Penetration Rates by Urban/Rural Split, Canada and Regions, 1983
(Percentage households with telephone service)

	CANADA	British Columbia	Prairies	Ontario Quebec	Atlantic Provinces
Urban	98.0	97.5	98.1	98.2	96.0
Rural	96.1	95.6	96.9	97.3	92.1

Source: Response to information request Bell(CRTC)19Feb86-11FP, Federal/Provincial Examination of Telecommunications Pricing and Universality.

b) Penetration levels and income

Telephone penetration levels are not uniform across households when subdivided into income categories. In general, penetration levels rise with income level. This is illustrated in Table 4.3 which shows telephone penetration by income categories and by geographic area. An additional point of interest is that the penetration level for households in the Atlantic provinces with annual incomes less than $6 000 is significantly lower than either the national average or any other region of Canada.

TABLE 4.3
Telephone Penetration Rates by Income Group, Canada and Regions, 1983
(Percentage households with telephone service)

	CANADA	British Columbia	Prairies	Ontario Quebec	Atlantic Provinces
Annual Income					
Less than $ 6 000	89.0	85.2	90.0	91.2	79.1
$6 000 - $15 000	94.7	94.6	95.6	95.3	90.0
More than $15 000	99.1	98.8	99.0	99.3	97.8

Source: Response to information request Bell(CRTC)19Feb86-11FP, Federal/Provincial Examination of Telecommunications Pricing and Universality.

c) Telephone service penetration by age group

Telephone penetration levels also vary by age group, as is illustrated in Table 4.4. The data presented in this table indicate that households headed by persons 15 to 25 years of age have penetration rates below national and regional averages.

TABLE 4.4
Telephone Penetration Rates by Age Group, Canada and Regions, 1983
(Percentage households with telephone service)

	CANADA	British Columbia	Prairies	Ontario Quebec	Atlantic Provinces
Age					
15 - 25	94.3	95.2	95.0	94.8	87.2
25 - 50	97.9	97.0	98.3	98.4	95.0
Over 50	98.1	98.1	98.3	98.3	95.4

Source: Response to information request Bell(CRTC)19Feb86-11FP, Federal/Provincial Examination of Telecommunications Pricing and Universality.

4.3.3 Telephone Service Affordability

a) Affordability and household income

Affordability of telephone service may be indicated by the percentage of household income spent on local telephone service. Table 4.5 shows the percentage of disposable income that the average household spends on local service in several major cities across Canada.

In those cities in Table 4.5 — with the exception of Saint John, Regina, Calgary and Vancouver -- telephone service is, using this measure, more affordable today than it was ten years ago,* although it generally consumes a larger portion of the average household's disposable income than it did in 1980. This latter effect may in part be due to the slow growth of personal income since the 1982-83 recession.

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* Using an alternative measure of affordability such as the ratio of the local service rate to the average industrial wage would yield marginally different results. In Regina, for example, the ratio decreased by 0.02 per cent between 1975 and 1984.

TABLE 4.5
Percentage Disposable Household Income Spent on Local Telephone Service, by City -- 1975, 1980 and 1984

	1975	1980	1984
St. John's - Nfld.	0.57	0.51	0.53
Charlottetown - P.E.I.	0.65	0.50	0.54
Halifax - N.S.	0.62	0.53	0.55
Saint John - N.B.	0.46	0.49	0.52
Montreal - Que.	0.50	0.44	0.49
Ottawa - Ont.	0.44	0.33	0.35
Winnipeg - Man.	0.29	0.32	0.28
Regina - Sask.	0.28	0.30	0.32
Calgary - Alta.	0.30	0.28	0.34
Vancouver - B.C.	0.47	0.41	0.53

Source: Telephone company General Tariffs and Statistics Canada Catalogues 13-531 and 64-202.

In general, local service appears quite affordable for most households in Canada. It consumes approximately 0.5 per cent (or less) of disposable incomes in major urban areas. In some suburban areas with extended area service (EAS), this percentage could be slightly higher, while in rural areas -- where both local rates and incomes are generally lower -- the percentage might be lower or higher.

b) Affordability and the cost of living

The impact of local service rates on household budget may be indicated by comparing the growth of local service rates with changes in the cost of goods and services. Table 4.6 shows local rate changes for the same cities discussed in the previous section relative to the Consumer Price Index (CPI) and other commonly available measures of the cost of living.

TABLE 4.6
Comparison of Local Rate Changes with Changes in CPI and Costs of Housing, Transportation, Bakery and Cereal Products, Tobacco and Alcohol

	% Price Change 1975 - 1980	% Price Change 1980 - 1984	% Price Change 1975 - 1984
Local Telephone - St. John's	30.0	40.0	82.0
CPI	64.0	42.0	133.0
Housing	76.0	50.0	164.0
Transportation	57.0	49.0	134.0
Bakery and Cereal Products	55.0	37.0	112.0
Tobacco and Alcohol	49.0	74.0	159.0
Local Telephone - Charlottetown	20.0	36.0	63.0
CPI	57.0	39.0	118.0
Housing	59.0	44.0	129.0
Transportation	59.0	50.0	138.0
Bakery and Cereal Products	N/A	47.0	N/A
Tobacco and Alcohol	N/A	65.0	N/A
Local Telephone - Halifax	34.0	32.0	76.0
CPI	62.0	39.0	125.0
Housing	71.0	45.0	148.0
Transportation	60.0	48.0	137.0
Bakery and Cereal Products	62.0	39.0	125.0
Tobacco and Alcohol	57.0	55.0	143.0
Local Telephone - Saint John	55.0	33.0	106.0
CPI	61.0	41.0	127.0
Housing	68.0	52.0	155.0
Transportation	55.0	47.0	127.0
Bakery and Cereal Products	58.0	45.0	129.0
Tobacco and Alcohol	50.0	64.0	146.0
Local Telephone - Montreal	32.0	40.0	85.0
CPI	59.0	41.0	124.0
Housing	61.0	47.0	137.0
Transportation	64.0	58.0	159.0
Bakery and Cereal Products	62.0	41.0	128.0
Tobacco and Alcohol	61.0	57.0	152.0
Local Telephone - Ottawa	20.0	40.0	68.0
CPI	59.0	40.0	122.0
Housing	61.0	46.0	135.0
Transportation	61.0	50.0	142.0
Bakery and Cereal Products	65.0	35.0	123.0
Tobacco and Alcohol	55.0	58.0	145.0

N/A: Data not available.

Table 4.6 (Continued)

	% Price Change 1975 - 1980	% Price Change 1980 - 1984	% Price Change 1975 - 1984
Local Telephone - Winnipeg	58.0	22.0	92.0
CPI	63.0	35.0	120.0
Housing	73.0	42.0	146.0
Transportation	65.0	43.0	136.0
Bakery and Cereal Products	73.0	39.0	140.0
Tobacco and Alcohol	55.0	60.0	148.0
Local Telephone - Regina	49.0	34.0	99.0
CPI	64.0	38.0	126.0
Housing	71.0	44.0	146.0
Transportation	68.0	43.0	140.0
Bakery and Cereal Products	62.0	45.0	135.0
Tobacco and Alcohol	65.0	56.0	157.0
Local Telephone - Calgary	55.0	48.0	129.0
CPI	61.0	38.0	122.0
Housing	79.0	39.0	149.0
Transportation	57.0	50.0	135.0
Bakery and Cereal Products	56.0	45.0	126.0
Tobacco and Alcohol	44.0	68.0	142.0
Local Telephone - Vancouver	39.0	51.0	110.0
CPI	58.0	41.0	123.0
Housing	61.0	41.0	127.0
Transportation	68.0	55.0	160.0
Bakery and Cereal Products	70.0	44.0	144.0
Tobacco and Alcohol	61.0	54.0	148.0

Sources: Telephone Company General Tariffs and Statistics Canada, Catalogue 62-010.

The data show that for the period 1975 to 1984, the real cost of subscribing to telephone service has declined appreciably. In addition, telephone rates have shown much smaller increases in comparison with price increases in other goods and services, such as housing and transportation.

4.3.4 Characteristics of Non-Subscribers

Tables 4.7 and 4.8 present data concerning non-subscribers to telephone service by income and geographic area. In 1983, the Statistics Canada low income cut-off was $16 641 for a family of three persons living in a large city. Table 4.7 indicates that more than two-thirds of Canadian households without telephone service had an annual income below the low income cut-off level.

This indicates a very strong correlation between income level and the decision not to subscribe to telephone service.

TABLE 4.7
Percentage Distribution of Households without Telephones by Income Group, for Canada and Regions, 1983

	CANADA	British Columbia	Prairies	Ontario Quebec	Atlantic Provinces
Annual Income					
Less than $8 000	37.7	37.9	37.5	37.5	36.8
$ 8 000 - $11 999	21.6	24.1	18.8	22.1	23.7
$12 000 - $15 999	12.7	6.9	12.5	14.4	13.2
$16 000 and over	28.0	31.0	31.2	26.0	26.3

Source: "Household Facilities by Income and Other Characteristics," Statistics Canada, Household Surveys Division. Unpublished data.

Table 4.8 provides the actual number of households without telephone service by income group and geographic area compared with the total number of households with telephone service. A point of interest is the large number of low-income households without telephone service in the Atlantic provinces. They are considerably more than those in either British Columbia or the Prairies, where the total number of households is much greater.

While most people in Canada have telephone service, Tables 4.7 and 4.8, together with the age-related data presented earlier, indicate that there are important exceptions -- particularly for young Canadians and even more so for low-income Canadians. For the former group, the decision not to subscribe to telephone service may be a function of lifestyle. College students, for example, move frequently and may in some circumstances engage in shared telephone arrangements. For low-income Canadians, on the other hand, a decision not to subscribe may more likely be due to economic considerations.

TABLE 4.8
Distribution of Households without Telephones by Income Group versus Total Number of Households with Telephones, 1983
(In thousands)

	CANADA*	British Columbia	Prairies	Ontario Quebec	Atlantic Provinces
Annual Income					
Under $8 000	77	11	12	39	14
$ 8 000 - $11 999	44	7	6	23	9
$12 000 - $15 999	26	2	4	15	5
$16 000 and over	57	9	10	27	10
Total Without Telephone	204	29	32	104	38
Total With Telephone	8 454	1 026	1 496	5 266	665

* Some numbers may not add up due to rounding.

Source: "Household Facilities by Income and Other Characteristics", Statistics Canada, Household Surveys Division. Unpublished data.

4.4 Impact on Subscribership of Current and Alternative Local Telephone Rates

4.4.1 Factors Contributing to Current Subscribership Levels

The continuous growth of telephone subscribership and its current high levels can be attributed to a number of factors. First, Canadians can use the telephone to communicate with each other over long distances at a fraction of the cost of travelling or the time of mail delivery. With transportation costs and the value or opportunity costs of time increasing faster than telephone rates, more people choose to use the telephone.

Second, as the Canadian telephone network continues to expand, more individuals may find the network attractive and deem it worthwhile to become a subscriber. This is due to the fact that the value to any individual of being on the telephone network depends on the availability of others either to call or to be called by. This effect is called a consumption "externality".

Third, the continued growth of real personal incomes together with the falling real price of telephone services and equipment has made local telephone service increasingly affordable. Fourth, demographic changes in Canada -- with an increasing proportion of the population over 50 years of age, a decreasing

population under 25 years of age and an increase in the number of single-head households -- may have contributed to an increased demand for telephone service. Fifth, telephone service has increasingly been extended to remote areas.

4.4.2 Impact of Price on Demand for Local Service

a) Consumer responses to price changes

Although the price of local telephone service is only one of the many factors that could affect consumers' decisions to subscribe, there is some concern that higher prices may significantly reduce the level of subscribership. The most commonly used measure of the effect of price changes on the demand for a commodity or service is price elasticity of demand. The price elasticity of demand is defined as the percentage change in quantity demanded resulting from a 1 per cent change in price. For example, if the price elasticity of demand for local telephone service is -0.03, a 100-per cent increase in price would reduce telephone subscribership by approximately 3 per cent.

The price elasticity of demand for telephone service has been extensively investigated in Canada and the United States. These studies vary widely in terms of quality, type of data used, model specification and statistical estimation procedure. Despite these differences, they all indicate that demand for local service is relatively insensitive to price changes, confirming the fact that telephone service is considered a necessity by most individuals.

Table 4.9 summarizes the findings of a number of major studies on price elasticity of residential demand for access to the telephone network in the United States. Table 4.10 presents the findings of major Canadian studies on the price elasticity of residential demand for local telephone service. An examination of the trend of estimates in the Canadian and US studies suggests that the price elasticity of demand for local telephone service has been falling over time. This observation is not surprising considering the fact that telephone penetration has been steadily rising in both Canada and the United States while real telephone rates have been falling. For example, in the United States telephone penetration rose from 80 per cent in the early 1960s to over 90 per cent in the early 1980s; research also suggests that price elasticity decreased significantly over the same period.

TABLE 4.9
Estimates of Price Elasticity of Residential Demand for Access to the Telephone Network in the United States

Study	Data	Price Elasticity
Alleman, J.H. (1977)[13]	1970 Census	-0.17
New York Telephone Co. (1976)[14]	1960s - 1970s New York State	-0.10
Perl, L.J. (1978)[15]	1970 Census	-0.08
National Economic Research Associates (1984)[16]	1980 Census in Contel's exchanges	-0.04
Taylor, L. and D. Kridel (1985)[17]	1980 Census in Kansas and Oklahoma	-0.023 -0.034
Egan, B.L. (1983)[18]	1972-1981	-0.04
Harvey, A.C. (1984)[19]	1980 New York State	-0.014

Table 4.10
Estimates of Price Elasticity of Residential Demand for Local Telephone Service in Canada

Study	Data	Price Elasticity
Waverman, L. (1974)[20]	1960s - 1970s Ontario and Quebec	-0.12
Rash, I.M. (1971)[21]	1960s Ontario and Quebec	-0.11
Bell Canada (1981)[22]	1973 - 1980 Ontario and Quebec	-0.444
Bell Canada (1984)[23]	1974 - 1983 Ontario and Quebec	-0.032

There are many theoretical reasons to support the empirical evidence that price elasticity of demand for local service has been falling rapidly in recent years. During the past two decades, the factors favourable to telephone demand have grown to such an extent that consumer perceptions of the value of local telephone service may far exceed the price of the service. This is in part confirmed by the Decima Research survey[24] which found that Canadians think their telephone system is operating well. That survey also found that only 3 per cent of the population thinks that local service rates are expensive.

Furthermore, recent studies by National Economic Research Associates[25] in the United States have successfully employed a model specification in which elasticity varies as a function of rate levels and which can explain the historical decline in price elasticity exhibited in the above-noted studies. Peat, Marwick and Partners[26] have employed this demand estimation model in a Canadian context where it has yielded elasticity estimates that are significantly lower than any other Canadian estimates so far developed.*

In addition to the modelling approaches described above, another seemingly attractive approach to estimating the number of drop-offs at alternative local rates is to project these numbers based on consumer responses to survey questions.** Unfortunately, survey answers to hypothetical questions of this nature usually differ from the course of action taken under actual situations. For instance, a 1983 survey conducted by the staff of the Public Service Commission of Indiana[28] reported that close to 50 per cent of interviewed subscribers said they would discontinue service if rates increased. In reality,

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* The Peat Marwick demand estimation model discussed in this chapter should not be confused with the Peat Marwick model used elsewhere in this report to determine the impact on local rates of long-distance rate changes.

** In the industry, telephone subscribers who cease to subscribe to telephone service are termed drop-offs. B.C. Tel in the summer of 1985 commissioned a survey of residence customers who were scheduled to have their service disconnected.[27] This report indicates that 95 per cent of the sample gave moving as the reason for disconnection; 2 per cent mentioned cost; 2 per cent mentioned dissatisfaction with the service and 1 per cent said that service was no longer required. Although 2 per cent of the total sample reported that their disconnect was due to the cost of the service, the report indicated no significant difference between the frequency of responses giving cost as the reason for disconnecting before and after a rate increase. However, given that the sample size was quite small, it is not certain whether these results can be generalized to reflect the reasons for service disconnection elsewhere in Canada.

the latest record indicates that while flat rates in Indiana rose 23 per cent from late 1983 to early 1985, during the same period telephone penetration actually increased by 1.5 per cent.

b) Staff model of consumer responses to price changes

Although existing studies and survey results provide valuable insights respecting consumer attitudes and responses, it is generally more reliable to examine data on telephone demand and to relate them to actual price changes. Given that existing studies fail to take into consideration the dynamics of price elasticity at different telephone rate and penetration levels, staff assigned to this examination have developed a statistical model relating telephone penetration at different locations across Canada to factors that determine telephone demand. Details of the model are contained in Appendix B. Econometric techniques were used to estimate the underlying relationship among telephone penetration and demand-influencing factors such as price, income and demographic measures. The estimates of local service price elasticities obtained from the model are presented in Table 4.11.

TABLE 4.11
Estimates of Price Elasticities Based on the Staff Model

	Price Elasticity of Demand for Local Service at Current Penetration Levels
Newfoundland	-0.054
P.E.I.	-0.046
Nova Scotia	-0.032
New Brunswick	-0.049
Quebec	-0.013
Ontario	-0.010
Manitoba	-0.027
Saskatchewan	-0.024
Alberta	-0.019
British Columbia	-0.022

The estimates presented in the table suggest that in Ontario a 100-per cent increase in local rates would reduce total subscribership by approximately 1 per cent. By contrast, in Newfoundland the proportionate effect is estimated to be much greater: a reduction of 5.4 per cent in subscribership would be predicted. Values for other provinces range between these two extremes.

While the above elasticity estimates suggest that changes in local service rates are unlikely to stop the growth of telephone subscribership in the aggregate, there is a subgroup of telephone users, however small in number, for whom telephone service is only marginally valuable or affordable. These include infrequent users and some very low-income households. Rate increases would have the largest impact on the affordability of telephone service for these subscribers. In addition, increases in security deposit, installation charge or interest penalties on late payments could also reduce affordability of service to these individuals. These latter items are explored more fully in the following section.

In the CRTC Interexchange Competition proceeding, Bell Canada, using its own econometric model, estimated that 160 000 residential telephone subscribers in its service territory would drop off the network if local rates increased by 100 per cent. Bell arrived at this estimate of drop-offs by applying its assumed price elasticity of -0.032 to the telephone subscribership in its territory. More recently, it has estimated this elasticity at -0.048, or 50 per cent larger.[29]

Staff results suggest that Bell Canada has overstated consumer reaction to price increases. There are a number of possible reasons for this. Most importantly, Bell's price elasticity estimate was produced using a model based on a data range that included the early 1970s -- a period when telephone rates were higher in real terms and penetration levels lower than today. Therefore, the Bell Canada estimates, while valid for the individual-line market for some historical periods, may not be valid for today's telephone market.

Peat, Marwick and Partners,[30] in its study of the impact of competition in long-distance services, developed a telephone demand function based on data estimated with a residential telephone demand model that can be used to estimate the number of households that would drop off the system at alternative local rates. Using the Peat Marwick results, the number of residence subscribers who would be likely to drop service in each province and at alternative local rates is presented in Table 4.12.

TABLE 4.12
Estimates of the Number of Drop-offs Based on Peat Marwick Formula for 1985 Household Base

	Increase in Local Rates			
	10%	25%	50%	100%
Newfoundland	253	632	1 264	2 527
P.E.I.	63	155	310	625
Nova Scotia	450	1 110	2 220	4 470
New Brunswick	447	1 081	2 162	4 347
Quebec	1 996	4 989	9 979	19 958
Ontario	2 026	5 130	10 130	20 261
Manitoba	159	388	776	1 590
Saskatchewan	252	620	1 273	2 519
Alberta	416	1 048	2 080	4 160
British Columbia	932	2 331	4 663	9 324

Note: P.E.I. estimate based on the elasticity estimates for Nova Scotia.

One limitation that should be noted concerning the Peat Marwick estimates is that they are based on an econometric model originally developed for selected residential telephone markets in the United States. It is not known whether the behaviour of US consumers is the same as that of Canadian consumers, given differences in socio-economic mix between the two countries.

Based on Canadian data, the staff model has been used to provide estimates of telephone penetration under alternative local rates. These are provided in Table 4.13. The results from the staff model suggest that there are wide variations across regions in the effects of price changes on telephone penetration. In general, it appears that in regions where penetration is high, demand is less sensitive to price changes. In regions where penetration is low, demand is more price-sensitive. These results are consistent with the belief that in areas where penetration is high, factors favourable to telephone demand are also at high levels, so that a change in price will have the least effect on the consumer's desire to subscribe to telephone service.

TABLE 4.13
Percentage Estimates of Telephone Penetration Levels under Alternative Local Rates Based on the Staff Model

	Current Penetration Level	Increase in Local Rates			
		10%	25%	50%	100%
Newfoundland	94.4	93.9	93.2	91.9	89.6
P.E.I.	95.2	94.8	94.1	93.1	91.1
Nova Scotia	96.7	96.4	95.9	95.2	93.8
New Brunswick	94.9	94.4	93.8	92.7	90.5
Quebec	98.6	98.5	98.3	97.9	97.3
Ontario	99.0	98.9	98.8	98.5	98.1
Manitoba	97.2	96.9	96.6	95.9	94.7
Saskatchewan	97.5	97.3	96.9	96.4	95.2
Alberta	98.0	97.8	97.5	97.1	96.2
British Columbia	97.7	97.5	97.2	96.6	95.6

Table 4.14 translates the penetration level estimates from Table 4.13 into estimates of the expected number of drop-offs resulting from increased local rates. Despite its improvement in methodology over many other existing residential telephone demand models, there are a number of reasons to believe that the staff model may also overestimate the number of drop-offs at the alternative local rate levels.

TABLE 4.14
Estimates of the Number of Drop-Offs under Alternative Local Rates Based on the Staff Model

	Increase in Local Rates			
	10%	25%	50%	100%
Newfoundland	800	1 900	4 000	7 700
P.E.I.	200	500	900	1 700
Nova Scotia	900	2 400	4 500	8 700
New Brunswick	1 200	2 600	5 200	10 300
Quebec	2 400	7 100	16 600	30 900
Ontario	2 900	6 200	16 000	29 000
Manitoba	1 100	2 300	5 000	9 700
Saskatchewan	800	2 200	4 000	8 400
Alberta	1 700	4 200	7 500	15 000
British Columbia	2 300	5 600	12 200	23 300

First, the staff model, because of availability of data on household income and demography, estimated penetration/price relationships based on 1978 and 1982 data. It therefore suffers from the same problems associated with Bell Canada's estimates, although to a smaller extent. Second, the staff model has not been able to capture the effects of certain "omitted" variables on consumer decisions to subscribe to service. In particular, the model does not account for the availability of two-or-more party service, nor does it allow for reduced long-distance rates arising as a consequence of increased local rates.

While the estimates of the number of potential drop-offs that would result from local rate increases may thus be overstated, the extent is not known. In the light of evidence that the price elasticity of demand for local service has been decreasing rapidly in recent years, a fact that suggests the value of telephone service to subscribers has increased considerably, it seems likely that, while they could result in some financial hardship for some subscribers, price changes would have little effect on telephone penetration levels. Although this suggestion has not been confirmed in Canada, the findings of a recent study in the United States appear to support this view.[31] This latter study found that in those states where local telephone rates increased between January 1984 and March 1985, no statistical relationship was detected between local rate increases and changes in penetration levels. That study, however, admitted that other factors, such as income, might have acted simultaneously on telephone penetration to offset the effects of price increases. Similarly in Canada, if (as seems likely) the factors favourable to telephone demand continue to prevail, such as rising prices for alternative means of communication, falling real prices for long-distance telephone rates, rising personal incomes, the growth of the telephone network and an aging population, to the extent that these factors are acting on telephone demand in the opposite direction from higher prices they could conceivably overcome any effects of local-service price changes.

4.5 Other Factors Affecting Universality

4.5.1 Deposits and Installation Charges

In addition to the monthly rate for local telephone service, it is likely that the level of security deposits and installation charges may, for some individuals, constitute a barrier to subscribing to telephone service. Intuitively, given high existing penetration rates, it may be these rate features rather than the monthly local rate level that most affect the decision to subscribe.

While the average consumer changes residences infrequently, some (and especially those under the age of 25) move more often and thus may be quite sensitive to installation charges. Moreover, some consumers, in particular those with low incomes, may not be able to afford the security deposits demanded by the telephone companies.

Although no research has been done on the effects of installation charges and security deposits on subscribership levels in Canada, a recent study in the United States provides some indication as to how these charges could affect telephone penetration.[32] While the US study found that a 50 per cent increase in installation charges reduced telephone penetration by 0.07 per cent, deposit requirements had an even more dramatic effect on access demand. That study estimated that raising deposit requirements from US$50 to $100 in CONTEL's service territory would reduce telephone penetration by 1.3 percentage points. Although it indicated the negative impacts on telephone demand of higher installation charges and security deposits, it is not known whether lower installation charges and security deposits would stimulate telephone demand by the same magnitude.

In Canada, most telephone companies require service subscribers to pay installation charges in a lump sum. However, the British Columbia Telephone Company does offer an instalment-payment plan to those subscribers wishing to allocate installation costs over a two- or three-month period. Use of this option, however, has been negligible.

In the United States, subscribers in the Bell Atlantic region can choose to pay off non-recurring charges in monthly instalments over a period of three to six months. And in California, installation charges are not required of subscribers who qualify for lifeline assistance.

4.5.2 Deposit Requirements

In general, most telephone companies in Canada require telephone service applicants or subscribers whose credit is not satisfactorily established with them to make a deposit or advance payment equal to an amount that the company considers sufficient to cover service charges, including anticipated long-distance usage for a number of months.

Telephone companies generally do not use a blanket rule in assessing deposits required of their customers. Each customer is assessed individually, and the maximum size of the deposit varies with the company concerned. Table 4.15 provides an indication of deposit requirements of some of the major telephone companies in Canada.

4.5.3 Non-Payment of Services

Telephone service may be denied to some consumers for non-payment of prior services, for example, those relating to long-distance calling. Two companies, British Columbia Telephone Company and Saskatchewan Telecommunications, submitted data on residence accounts terminated for non-payment. For B.C. Tel, 21 000 residence accounts were terminated for non-payment in 1985 and 24 400 in 1984, representing about 1.6 and 1.9 per cent of the company's total accounts for the two years. For SaskTel, the number of permanent disconnects for non-payment was 3 529 for 1983 and 5 400 for 1984, representing 0.8 and 1.2 per cent of the company's total accounts for the two years.

It is likely that a certain number of non-payments of accounts will exist regardless of price increases for local services. Non-payment for some subscribers results from personal financial circumstances or other personal situations. For example, as indicated above, there were 5 400 disconnects for non-payment in 1984 in the territory of SaskTel, yet there were no rate increases during that year. While this is only one example, it does suggest that other factors are operating.

Finally, to the extent that many disconnects relate to charges associated with long-distance calls, offering a service that allows for local calling only, with access to the long-distance network being prevented, might reduce terminations due to credit problems. Such a service offering does, in fact, currently exist in some territories.

TABLE 4.15
Deposit or Advance Payment Required by Telephone Company

Company	Deposit Amount
Maritime Telegraph and Telephone Company Limited	Varies. Not more than two months local charges plus anticipated long-distance charges.
New Brunswick Telephone Company, Limited	Not more than the cost of estimated long-distance and local service for six months.
Bell Canada	Not more than three months charges for all services including anticipated charges for long-distance calls and equipment.
Manitoba Telephone System	$50 for new customers who have not established a satisfactory credit standing with the company.
Saskatchewan Telecommunications	Varies.
Alberta Government Telephones	New Service: Monthly rental plus estimated monthly long-distance usage x 2. Existing Service: Monthly rental plus three-month average of long-distance billing x 2.
British Columbia Telephone Company	Not more than three months charges for all services including anticipated charges for long-distance calls and equipment.

Note: Prior to 1986, Bell's and B.C. Tel's three-month period was six months.

4.5.4 The CROP Study

In an effort to understand better the reasons why certain individuals do not subscribe to telephone service, CROP Inc. was commissioned by the examination to undertake a market survey of non-subscribers. A total of 71 interviews were held with individuals who do not presently have a telephone. Tables 4.16 and 4.17 summarize the reasons given by those surveyed for not subscribing. Table 4.16 presents the responses of individuals who have not previously had telephone service. Table 4.17 provides a breakdown of the reasons given by individuals who have had telephone service at one time or another.

TABLE 4.16
Reasons for Non-Subscribership
(Individuals with no previous telephone service)

	TOTAL	Halifax N.S.	Kent Cnty N.B.	Montreal P.Q.	Kingston Ont.	Leaming-ton Ont.	Winnipeg Man.	Lethbridge Alta.	Kelowna B.C.
Interview Sample Size	20	1	5	7	0	1	0	1	5
% Indicating:									
- Too expensive	45.0	0	60.0	71.0	0	0	0	0	20.0
- No need	20.0	0	0	14.0	0	0	0	0	60.0
- Doesn't like Telephone	15.0	0	20.0	0	0	0	0	0	20.0
- Other	20.0	100.0	20.0	14.0	0	100.0	0	100.0	0
- Don't Know/ No Answer	0	0	0	0	0	0	0	0	0

Source: CROP Inc., "Etude auprès des non-abonnés du service telephonique," Report commissioned by the Federal/Provincial Examination of Telecommunications Pricing and Universality, August 1986.

TABLE 4.17
Reasons for Non-Subscribership
(Individuals who previously had telephone service)

	TOTAL	Halifax N.S.	Kent Cnty N.B.	Montreal P.Q.	Kingston Ont.	Leamington Ont.	Winnipeg Man.	Lethbridge Alta.	Kelowna B.C.
Interview Sample Size	51	7	3	3	10	6	12	6	4
% Indicating:									
- Too expensive	29.0	29.0	33.0	67.0	20.0	33.0	17.0	33.0	50.0
- No need	4.0	14.0	0	0	0	0	0	0	25.0
- Doesn't like telephone	14.0	14.0	0	0	50.0	0	0	17.0	0
- Problems with bill	16.0	14.0	33.0	0	10.0	17.0	33.0	0	0
- Other	33.0	14.0	33.0	33.0	20.0	33.0	50.0	50.0	25.0
- Don't Know/ No Answer	4.0	14.0	0	0	0	17.0	0	0	0

Source: CROP Inc., August 1986.

While approximately one-third of those former subscribers interviewed cited cost* as the reason for non-subscription, this was equally true for non-subscribers with annual incomes below $5 000, above $20 000 and between these amounts. This finding suggests that while cost can be a factor in the decision not to subscribe to telephone service, it is unlikely to be the only one considered. Other reasons for non-subscribership given by those surveyed included the desire for privacy and a simple dislike of telephones. However, considering the small size of the sample and the fact that it was not randomly selected from the population of non-subscribers and is non-representative in a number of ways, caution should be used in assessing these results. At the same time, a careful look at the detailed survey results could provide some important insights into non-subscriber behaviour.

4.6 Effect of Long-Distance Rates on Universal Availability of Service

4.6.1 Introduction

Subscribers in certain regions of the country, particularly rural, remote and northern communities, rely heavily on long-distance services. For these subscribers, the level of long-distance rates rather than the level of local rates may be the most important determinant of whether or not to subscribe to telephone service. This section will explore briefly the effect of long-distance rates on universal availability of service.

4.6.2 Impact of Current Long-Distance Rates on Universal Availability of Service

There are two types of data available that have a bearing on this issue: the level of subscribership and average monthly expenditures on long-distance services in urban as compared to rural areas.

Figure 4.1 indicates the penetration level of telephone service in urban and rural areas, broken down by geographic region. It shows that

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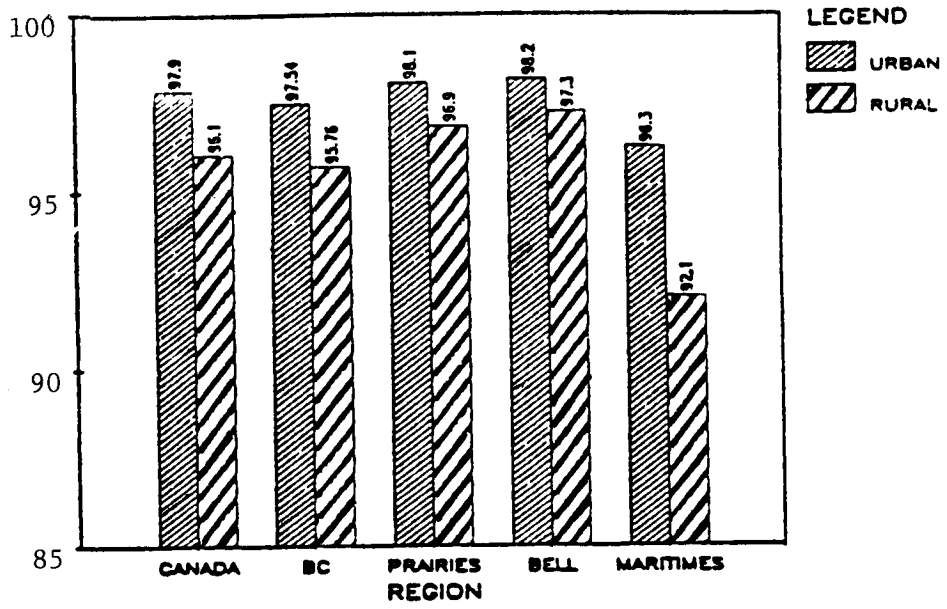
* The CROP survey results do not distinguish between local and long-distance rates in this regard.

penetration is higher in urban than in rural areas for all regions of Canada. On a national basis there is, on average, a difference of 1.8 per cent in the level of subscribership between urban and rural areas. More dramatically, however, the penetration level for households in the northern part of British Columbia, the Yukon and parts of the Northwest Territories is below 80 per cent (based on 1981 data) -- more than 15 per cent below the national average. As noted earlier in this chapter, the penetration level in certain areas of Northern Saskatchewan was 53 per cent in 1981. It may be assumed that this pattern of low subscribership levels exists in other remote areas as well.

FIGURE 4.1
Penetration Level By Region and Urban/Rural Split



Source: Response to information request Bell(CRTC) 19Feb86-11FP, Federal/Provincial Examination of Telecommunications Pricing and Universality (Attachment, p.4).

With regard to expenditures on long-distance services, the most recent data available are from Bell Canada responses to CRTC interrogatories in the proceeding leading up to Telecom Decision CRTC 85-16.[33] These data are presented in Table 4.18, and they indicate average monthly long-distance revenues per line for each of the three regions in the Remote North and for the company as a whole.

TABLE 4.18
Average Monthly Long-Distance Revenue
Per Network Access Service, 1978-1984

Region	1978	1979	1980	1981	1982	1983	1984
Remote Northern Ontario	$36.79	$48.36	$54.81	$57.44	$71.71	$76.47	$89.45
Northern Quebec	$33.20	$38.10	$43.31	$48.07	$57.77	$66.34	$74.02
Northwest Territories	$43.13	$51.84	$54.78	$58.65	$67.35	$71.96	$76.43
Average Company Revenue	$13.83	$15.63	$17.16	$19.95	$19.79	$21.20	$24.25

Bell Canada defines the Remote North as that part of its operating territory where rail and road lines do not exist. It is divided into three regions:

1. Remote Northern Ontario: the area north of the 51st parallel;
2. Northern Quebec: the area along the eastern shore of Hudson's Bay, the southern shore of the Hudson Strait and the shores of Ungava Bay; and
3. Northwest Territories: all areas of the Northwest Territories served by the company, including Baffin Island, the District of Keewatin and Belcher Islands.

Before examining the data, it should be kept in mind that the long-distance rates in these remote areas are lower than those charged in the rest of Bell's territory. The CRTC adopted special lower rates for intra-Bell long-distance calls in the North in 1978, as an interim measure in recognition of the special circumstances of remote northern area subscribers. In the CRTC's view, these circumstances included the isolation of remote communities from each other, the absence of reliable alternatives to telecommunications -- such as

road and rail links and dependable air services -- the wide area over which their community of interest extends, and the small size of most of these communities. The CRTC was also concerned with the financial burden placed on subscribers in remote northern areas due to the relatively low value received for local rates and their heavy dependence on long-distance services.

The data in Table 4.18 indicate that long-distance expenditures in Bell's remote regions are approximately three times those of the average Bell subscriber. This result is particularly significant given the lower rate for intra-Bell long-distance calls in the North. These isolated subscribers are indeed heavily dependent on long-distance services.

Figure 4.1 and Table 4.18, when considered together, suggest that one of the reasons for lower levels of penetration in rural and remote areas may be the level of long-distance expenditures in non-urban areas. However, a note of caution is in order. There may be factors other than price that account for the difference in penetration levels between urban and rural areas. These could include low service quality, lengthy installation waits and the fact that, in some remote areas, service is simply not available on an economic basis.

4.6.3 Impact of Possible Alternative Long-Distance Rates on Universal Availability of Service

To the extent that the level of long-distance expenditures in certain areas, the Remote North or elsewhere, may be seen as having a negative impact on universal availability of service in these regions, a number of options are available. First, such subscribers would benefit from any general lowering of long-distance rates, even if accompanied by higher local rates. Another option is the adoption of lower long-distance rates for subscribers only in such regions, as a means of bringing their total monthly telephone charges more in line with those of other subscribers. As noted, the CRTC initially implemented lower long-distance rates in the North as an interim measure pending the completion by Bell of studies assessing other mechanisms for responding to the special circumstances of these subscribers. In Telecom Decision CRTC 85-16, the CRTC reviewed a number of options for providing long-distance rate relief and decided, among other things, to continue the lower long-distance rates to all remote northern subscribers.

Two other categories of alternatives were addressed in that decision:

1. Extended area service (EAS)-type interexchange calling plans involving expanded toll-free calling areas.
2. Optional calling plans (OCPs) and Econo-Pak service (also called message time allowance plan).

An EAS-type interexchange calling plan would provide long-distance rate relief in terms of flat-rate long-distance calling. The CRTC identified a number of factors which it considered argued against the adoption of EAS-type plans for remote northern subscribers:

- the significant net revenue impact on Bell
- the low interdependence among the exchanges within each region and
- the overall increase in monthly bills that would be experienced by some subscribers under some of the plans.

Such plans may nevertheless be a viable alternative where there is greater interdependence among exchanges within a region.

The options of Econo-Pak and OCPs both involve discounted long-distance calling. Econo-Pak, which is now available throughout Bell's territories, provides blocks of long-distance calling at a flat rate. That is, for a flat fee the subscriber is entitled to a certain amount of long-distance calling to any exchange within the province. In Telecom Decision CRTC 85-16, the Commission decided that Econo-Pak should be offered throughout the three remote northern regions on the grounds that some subscribers in almost every exchange would benefit without negatively affecting those subscribers who do not opt for the service. The CRTC also directed Bell to develop a proposal to inform subscribers in the three regions of the Econo-Pak plan and to instruct them how to calculate whether or not they would benefit from the service.

Optional calling plans also involve discounts to the regular long-distance rate. In the case of Bell's OCP, discounts are available only for calling between two exchanges located within 40 miles of each other and which have a community of interest of at least 50 per cent. B.C. Tel, NBTel and SaskTel also offer optional calling plans.

The criteria for such plans can be modified as appropriate to particular regions. Note, however, that since OCPs offer discounts on traffic to particular exchanges, they may not be helpful where subscriber calling patterns are not largely confined to a small geographic region. In the case of Bell's remote northern subscribers, the CRTC chose rate relief in the form of Econo-Pak rather than OCPs because the calling interests of these subscribers were not limited to exchanges within the Remote North but extended as well to exchanges to the south.

4.7 Conclusion

The goal of universal availability of telephone service at affordable prices is widely accepted in Canada and, for the most part, would appear to have been substantially achieved. While there are variations by geographic area, income level and other demographic factors, the percentage of households in Canada having telephone service is extremely high both in absolute terms and in comparison to the United States and other industrialized nations. At the same time, the percentage of household income spent on basic local service is relatively low for most families.

A number of empirical estimates of the relationship between the level of local rates and telephone service penetration were reviewed and specific estimates have been presented in this chapter. In general, it would appear that increases in local rates, even of a magnitude of as much as 100 per cent, would be unlikely to result in any significant reduction to telephone service penetration levels. Furthermore, in some rural and remote communities, the level of long-distance rates may have a greater impact than local rates on the perceived affordability of telephone service.

CHAPTER 4

ENDNOTES

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CHAPTER 4

APPENDICES

CHAPTER 4

APPENDIX A
Telephone Penetration Levels in Countries
Outside North America, 1982

Country*	Percentage of Households with Telephone Service
Australia	86.0
Brazil	23.0
Columbia	16.0
Czechoslovakia	22.0
Ethiopia	1.0
Greece	62.0
Italy	63.0
Japan	82.0
Netherlands	93.0
Poland	12.0
Saudi Arabia	28.0
Singapore	78.0
Spain	52.0
Sweden	100.0
United Kingdom	87.0

Source: AT&T, The World's Telephones, 1983; and United Nations, Compendium of Housing Statistics, 1983.

* In the chapter, it is noted that current penetration levels in Canada and the United States are approximately 98 per cent and 92 per cent, respectively.

CHAPTER 4

APPENDIX B
Staff Model of Local Telephone Demand

This Appendix presents the model which staff assigned to this examination developed to assess the relationship between telephone penetration and telephone demand-influencing factors.

I. Specification and Estimation Results

As noted in Chapter 3, there are many factors that could influence the demand for local services. Among these are local telephone service rates, personal incomes, the size of the local network, local population mix, prices for alternative means of communication and long-distance service rates.

Although a local telephone demand model can be specified in a number of ways, a logit model is particularly appropriate to formulate consumers' decisions to subscribe to local service.* In a logit specification, telephone penetration (Pen) can be expressed as a function of demand-influencing factors:

$$Pen = e^{z} / 1 + e^{z}, \qquad (1)$$

where: z is a vector of demand-influencing variables multiplied by their respective coefficients.

After transformation, a logit model can be written as:

$$\ln \left(\frac{Pen}{1 - Pen} \right) = b \ln X + u, \qquad (2)$$

where: Pen is observed telephone penetration;

b ln X, identified as z in equation (1), is a vector of demand-influencing variables, X, multiplied by their respective coefficients, b; and u is a stochastic disturbance term.

(Pen / 1 - Pen) can be interpreted as the odds in favour of having a telephone.

The demand-influencing variables included in the model for this study are: local service rate (single-party), average household income, proportion of the population aged 65 or over and local total telephone count. The last variable is used to represent the size of the local telephone network. Its presence is intended to capture the effect of any consumption externality.

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* In the telecommunications sector, L. J. Perl (1978), for instance, has used logit models to estimate telephone demands with cross-sectional data. Perl's estimates were introduced at the AT&T antitrust trial, reproduced by the FCC as part of an appendix in its access charge order and cited by many witnesses in Congressional hearings. More generally, the logit specification is widely used to model binary choice situations such as that of deciding whether or not to buy a particular good or follow a particular course of action.

Ideally, the prices for alternative means of communication and long-distance service rates, among others, should be included as demand-influencing variables in the model. However, the difficulties in assigning appropriate representative measures of such variables at the aggregate level preclude the use of such variables at this stage.

Data on both penetration rates and demand-influencing variables at the exchange level for the years 1978 and 1982 were obtained from Statistics Canada. The absence of data on income and demographic variables precluded the use of more recent data for the model. (See Statistics Canada, "Family Expenditures in Canada," Catalogue 62-550 (1978, 1982); "Telephone Statistics," Catalogue 56-203 (1978, 1982); and Telephone Company General Tariffs.)*

The least-squares regression technique was used in the estimation of the coefficients in the model. The following table provides the regression results:

R^2 = 0.50		F-Statistic = 6.28
Variable	**Coefficient Estimate**	**t-Statistic**
Constant Term	-5.722	-0.58
Local Rate	-0.960	-3.09
Average Income	1.077	1.04
Proportion of Population aged 65 or over	0.498	0.89
Total Telephone Count	0.215	2.79

As shown above, all the coefficient estimates have the correct signs. Specifically, increases in average household incomes, the proportion of the population aged 65 or over and total telephone count would increase telephone penetration while increases in rates would depress telephone demand.

A problem often encountered in cross-section studies is that of heteroscedasticity. The presence of heteroscedasticity means that least-squares estimates, while unbiased, are not efficient. Applying Goldfeld and Quandt's F-test to the data used for this model indicates that the assumption of homoscedasticity cannot be rejected.** The R^2 statistic is also high for a cross-sectional model and suggests that a good data fit has been obtained.

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* Data used for the model include the following cities: St. John's, Charlottetown, Halifax, Saint John, Quebec, Montreal, Ottawa, Toronto, Thunder Bay, Winnipeg, Regina, Saskatoon, Calgary, Edmonton and Vancouver.

** Using the Goldfeld and Quandt approach, an F-statistic of 2.65 (which is not significant at the 1% level) was obtained.

II. The Impact of Local Rate Changes

The following section derives the equation used in the estimation of telephone penetration under alternative local-service rates.

In the model represented by equation (2), one of the variables in vector X is local service rate (Rate). Thus, vector X can be partitioned into X1 and Rate where X1 contains all the demand-influencing factors in X except Rate. Thus the equation can be written as:

$$\ln\left(\frac{Pen}{1 - Pen}\right) = b \ln X1 + r \ln Rate \cdot \quad (3)$$

where: $$\frac{Pen}{1 - Pen} = X1^{b}\ Rate^{r} \cdot$$

Let o indicate current values and n indicate revised values:

$$\frac{Pen_o}{1 - Pen_o} = X1^{b}\ Rate_o^{r} \cdot$$

Let price increase by a factor of m. Thus, $Rate_n = (1 + m)\ Rate_o$.

$$\frac{Pen_n}{1 - Pen_n} = X1^{b}\ Rate_n^{r} = X1^{b}\left[\ [1 + m]\ (Rate_o)\ \right]^{r}$$

$$= X1^{b}\ (1 + m)^{r}\ Rate_o^{r}$$

$$= (1 + m)^{r}\ \frac{Pen_o}{1 - Pen_o} \cdot$$

Pen can be simulated at alternative rates using the above equiation.

III. Derivation of Price Elasticity Formula

The following section derives the formula for the local rate elasticity inferred by the logit model.

The logit model represented by equation (1) can be written as:

$$Pen = e^{b \ln X} / 1 + e^{b \ln X},$$

Where $z = b \ln X$.

$$\ln Pen = \ln (e^{b \ln X}) - \ln (1 + e^{b \ln X}).$$

As the local rate is one of the variables in the vector X differentiation of the above equation with respect to the local rate, (R) leads to:

$$\frac{\frac{\partial Pen}{\partial R}}{Pen} = b_1 / R - \frac{e^{b \ln X} (b_1 / R)}{1 + e^{b \ln X}}$$

$$= b_1 / R - Pen (b_1 / R)$$

$$\frac{\partial Pen}{\partial R} = \left(b_1 / R - Pen (b_1 / R) \right) Pen . \qquad (4)$$

$$\text{Local Rate Elasticity} = \frac{\partial Pen}{\partial R} \times \frac{R}{Pen} .$$

Substituting equation (4) into the local-rate elasticity formula provides:

$$\text{Local Rate Elasticity} = b_1 (1 - Pen)$$

= Price coefficient X (1 - Penetration).

CHAPTER 5

Effects of Telephone Company Rates on Avoiding Uneconomic Bypass

CHAPTER 5

TABLE OF CONTENTS

5.1 Introduction

The subject of bypass both in Canada and the United States has been the focus of increasing debate due to concerns that large users may take advantage of new technologies or competitive services to avoid traditional local or long-distance services. Proponents of the concept of bypass as a threat, particularly the telephone companies, contend that certain telephone company services (e.g. message toll service (MTS) and wide-area telephone service (WATS)) are priced well above cost in order to contribute to reduced rates for local service. As a result, they argue that incentives exist for high-volume users to reduce their costs by electing to utilize lower priced services and facilities to carry their messages. Since a very small number of users account for a disproportionately high percentage of long-distance revenues, their avoidance of telephone company services could cause significant erosion of revenues and stranded investment in facilities. It is feared that large scale bypass might also cause significant upward pressure on rates generally, resulting in even more incentive to bypass, and this could ultimately threaten the preservation of affordable telephone service.

While the above argument tends to support the position of parties who seek a reduction in long-distance rates or advocate a movement toward cost-based pricing, the major premises of this argument are not universally accepted. Many parties contend that the degree to which long-distance contributes to local costs is not proven. Others argue that bypass is synonymous with competition and by casting it in a negative light, regulators and policy-makers may be less disposed to support the introduction of a range of innovative services. Still others contend that the incidence of bypass is overstated and to the extent that it does occur, it is a result of the telephone companies themselves providing discounted services to large users.

Based on a review of the literature and the experience to date in Canada and the United States, certain tentative conclusions are drawn regarding the nature of bypass, its incidence in Canada and the possibilities for increased bypass activity in the future. These conclusions are presented at the end of this chapter. First, however, the chapter defines different types of bypass and examines the incentives for bypass activity. It then explores the opportunities that exist for bypass and reviews available evidence as to the extent of bypass.

5.2 Definition of Uneconomic Bypass

5.2.1 The Concept of Bypass

Defined in terms of the objectives of this examination, bypass can be said to involve the selection by customers of alternatives to some or all of the local and long-distance services provided by the telephone companies. For the purposes of this exercise, this definition can be further refined to focus on voice and data messages that could have used facilities available to the general public.

5.2.2 Types of Bypass

(a) Facility bypass occurs where a customer elects to provide his or her own facilities (e.g. private microwave) in lieu of local or long-distance services that could be provided by the telephone companies. Facility bypass is the most likely form of bypass to create a potential for permanently stranded investment since customers are locked into their own investment even where telephone company prices change.

(b) Carrier bypass occurs where a customer elects to use services provided by a carrier (or reseller) other than the telephone company. Carrier bypass could involve the use of services such as those of Cantel, Telesat or CNCP Telecommunications or the diversion of Canada-Canada traffic over US networks. Carrier bypass may have less potential to result in permanent stranded investment since customer costs are not related to any significant fixed investment. Thus, where telephone company rates change, customers can choose to migrate back to telephone company services.

(c) Service bypass involves the substitution by customers of telephone company services where rates include low levels of contribution (e.g. private line), for telephone company services where rates include higher levels of contribution (e.g. MTS). This type of bypass involves customer avoidance of contribution payments rather than the total avoidance of telephone company services. The lower levels of contribution built into private line rates (or even WATS relative to MTS) may help deter other forms of bypass.

5.2.3 Uneconomic Bypass

Uneconomic bypass is said to occur when telephone company services or facilities cost less to provide than similar bypass services or facilities, but bypass service can be priced lower because telephone rates are set in excess of associated costs. In trying to assess the causes or incidence of uneconomic bypass, a number of problems arise. These include:

1. The costs of a particular service or technology are likely to vary over time relative to other services and technologies.

2. There is no agreement on how to measure telephone company costs.

3. It is difficult to ensure that all the costs of a bypass system are accurately measured.

4. No private system is likely to provide all the equivalent features of a telephone service.

5. Users may bypass for reasons other than price -- such as quality, availability, reliability, user control or security.

In addition to some of the difficulties set out above respecting the measurement of uneconomic bypass, certain other considerations should be noted. For example, in assessing the opportunities for uneconomic bypass it must be recognized that a user has an incentive to avoid using high-priced telephone company long-distance services by attempting to utilize lower priced alternatives. Within the range of services provided by telephone companies, a user with sufficient MTS traffic may migrate to WATS or private line service because such services are more economical. To the extent that certain discounted services may cost less to provide than higher priced services, such bypass can be considered economic. It may, however, result in lost contribution. By the same token, the diversion of Canada-Canada traffic through the United States may be attractive even where Canadian long-distance service is priced at cost. Such a diversion of traffic may be economic and yet could result in significant stranded investment and lost contribution. Therefore, to the extent that this study is

concerned with the impact on subscribers of lost contribution or revenue erosion, it should be understood that attempts to differentiate between economic versus uneconomic bypass may not always be entirely useful.

In the United States, telephone companies have ceased to argue as to whether a service is economic or uneconomic and are now seeking mechanisms to compete in the marketplace. Rather than constrain the ability to bypass through regulatory or legislative prohibitions, US telephone companies advocate a reduction in the present regulatory constraints that foster bypass and limit telephone company responses to competition. Foremost among their proposed solutions are the allocation of local access costs to end users, adequate capital-recovery formulas and flexible pricing. The first of these would reduce interexchange rates and thus the incentive to bypass. The second would facilitate plant replacement in the wake of new technologies. The third would allow competitive responses to bypass threats to be more precisely targetted.

5.3 Incentives For Bypass

5.3.1 Introduction

As noted above, bypass may be motivated for a variety of reasons other than price. However, to the extent that this examination is focussed on rates, price must be considered an important factor. While uneconomic bypass may be difficult to isolate, customers do have considerable incentive to bypass services where the prices for those services are considered higher than those of available alternatives.

In assessing the incentive for bypass, a number of factors should be considered. First, studies in the United States demonstrate that where other factors are equal, customers require a certain level of discount prior to electing to bypass. In New York State, for instance, the Bethesda Research Institute (1984) found that:

> if New York Tel and a bypass provider offer equivalent nonprice features, then the telephone company would probably receive the user's business if its price is 5 percent higher. However, when the telephone company's "price" is 10 percent higher, the bypass provider would capture the business.[1]

The institute also found that if the telephone company provided superior technical quality, it would retain its business even with a 10 per cent

difference. Furthermore, it found that New Jersey Bell could retain its customers with even higher price differences.[2] (New Jersey Bell was perceived by customers to provide a higher grade of service than New York Tel.)

In the D.A. Ford study (1986), it was estimated that insofar as international bypass was concerned,

> Canadian business users will not change their telecommunications purchasing decisions unless an incentive greater than 10% is available ... to overcome the lower quality of service and inconvenience resulting from having to make two calls in order to complete one.[3]

The D.A. Ford study also noted that with regard to companies interviewed that were presently engaged in international bypass, "In virtually every case, the reason given for accessing U.S. competitive services was to reduce company expenditures."[4]

A second point to consider is the type of interexchange service utilized by large customers. It is likely that customers seeking to reduce their long-distance costs will attempt to avail themselves of discounted telephone company services prior to considering facility or carrier bypass. Given that there is general agreement that private line rates embody significantly lower contributions than MTS/WATS rates, service bypass must also decrease the contribution available for the support of local access. Whether any incentive for carrier bypass or facilities bypass remains must depend on the cost of these alternatives as compared to telephone company rates.

To the extent that there are incentives for carrier or facilities bypass, these could be increased by requiring telephone companies to increase the contribution derived from private line rates. A lowering of MTS/WATS or private line rates would, by contrast, reduce such incentives.

5.3.2 Cost of Non-Carrier Provided Alternatives

In assessing monetary incentives for bypass, one must compare telephone company prices with the costs of alternative systems of equal value. It is difficult, however, to obtain good estimates of the cost of alternative systems. Among the reasons cited for this are: (a) the subjective value placed on various services and systems by the user; (b) a lack of standardized costing criteria

with respect to various systems and services; (c) advantages and disadvantages with regard to the characteristics of particular technologies (e.g. security, maintenance, right of way); and (d) changes in cost relationships over time. With these caveats in mind, cost comparisons derived from a US study on microwave, fibre optics and satellite are presented below.[5] In the study, the following conclusions were reached:

- At a distance of 50 km, regardless of capacity, optical fibre and microwave are significantly less expensive than satellites. Microwave is the least expensive medium in low-capacity applications.

- At a distance of 500 km, microwave is the least expensive at low capacity, but satellites become less expensive relative to fibre optics at low capacity due to distance insensitivity for satellites and high installation and repeater costs for fibre. Optical fibre becomes more economical as capacity increases significantly.

- At 5 000 km, satellites become the most economical for all but the highest capacity applications.

- In general, satellite circuits appear best for relatively long, lightly loaded links; optical-fibre systems are best suited for shorter or heavier routes; and microwave appears to fall in between the two.

While the above sets out some general observations on the relative costs of these systems, several other factors must be assessed in determining their value to a particular customer:

- Satellites are an excellent medium for point-to-multipoint applications. Most such applications would be for data as opposed to voice services.

- For small users, satellites should provide benefits since they can lease capacity (or services) from Telesat Canada and avail themselves of lower-priced earth station facilities due to competition in this

market. One of Telesat's marketing strategies, which may provide some users with a competitive alternative to telephone company long-distance service, will be focussed on VSAT* low-cost earth stations for corporate users with low-density multipoint communication requirements.

- Microwave and fibre optics are better suited to large users with demands for high capacity.

- Regardless of the capacity, a typical node for a microwave system would require expenses for land, a tower, a site building or equipment shelter, radio antenna(s), cables, installation and backup. Costs per channel vary with the number of channels and distance -- the greater the number of channels, the lower the cost; the greater the distance, the greater the cost.

- In the same vein, the costs of fibre optics vary widely due to their dependence on installation expenses such as right of way (conduit rental), digging of trenches and number of repeaters.

A final factor in comparing the benefits of various technologies is the role of the telephone companies. The telephone companies presently provide interexchange services utilizing many of the same technologies used for bypass (e.g. satellite, microwave and fibre optics). Their ability to compete effectively with bypass systems depends to a large extent on their flexibility in pricing services at a competitive level. To ascertain whether further pricing flexibility (e.g. customer, technology or route-specific pricing) is required, it is necessary to determine first whether, regardless of price incentives to bypass, the opportunities for actual bypass exist.

5.3.3 Canada/US Rate Comparisons

Using an exchange rate of 1.40, the D.A. Ford study (1986) has produced a table (see Table 5.1 below) demonstrating US/Canada rate ratios for a variety

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* Very small aperature terminal.

of similar telecommunication services offered in both countries. The figures have been derived for predominantly large business customers and are based on a number of assumptions, such as distance, composite mix of services, usage, etc.* Among the general conclusions reached were the following:

> With respect to differences in telecommunications costs, certain telecommunications rates, particularly long distance rates, are much lower in the United States than they are in Canada. For example, even taking into account the current exchange rate of approximately 1.40, we calculated the following average differentials for domestic services:
>
> - Message toll rates are 37% lower.
> - Private line voice rates are 49% lower.
> - Private line data rates are 52% lower.
>
> However, it should also be noted that the rates for access to the local network are often higher than they are in Canada.[6]

While there would seem to be an incentive for bypass due to the difference in US/Canada rates, the D.A. Ford study found that a number of factors minimized this incentive. These include:

1. Current exchange rates act as a deterrent to cross-border resale and most private line access.

2. Rate restructuring of Canada-US rates involving significant increases to short-haul MTS rates can or will curtail cross-border reseller revenues. (This has occurred in British Columbia.)

3. Most population centres are too far from the Canada-US border for significant terrestrial access.

4. Most corporate users surveyed will not, as a matter of policy, contravene Canadian telecommunication regulations and policies.

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* The methodology behind these results can be found at pages 42-49 of the D.A. Ford report.

TABLE 5.1
US/Canada Rate Ratios

	LARGE BUSINESS (Exchange Rate 1.40)	
		RATIO US/CAN
MESSAGE TOLL	CANADA - CANADA	0.630
	CANADA - US	1.166
	CANADA - OVERSEAS	0.862
WATS	INTRA-PROVINCIAL	0.553
	INTER-PROVINCIAL	0.553
"800" SERVICE	CANADA - CANADA	0.676
	CANADA - US	1.257
PRIVATE LINES - VOICE		
	CANADA - CANADA	0.512
	CANADA - US	0.959
	CANADA - OVERSEAS	0.959
TELPAK		
	CANADA - CANADA	1.056
	CANADA - US	1.232
	CANADA - OVERSEAS	1.232
PRIVATE LINES - DATA		
	CANADA - CANADA	0.476
	CANADA - US	0.938
	CANADA - OVERSEAS	0.938
PBX TRUNKS		0.650 - 1.970
TELEX OR TWX	CANADA - CANADA	0.531
	CANADA - US	1.165
	CANADA - OVERSEAS	0.966
PACKET SWITCHED	CANADA - CANADA	1.053
	CANADA - US	1.053
	CANADA - OVERSEAS	1.053
SATELLITE TRANSPONDERS		0.900
SPECIAL ASSEMBLIES & NON-TARIFFED SERVICES		1.000
	SMALL BUSINESS	
		RATIO US/CAN
MESSAGE TOLL	CANADA - CANADA	0.660
	CANADA - US	1.166
	CANADA - OVERSEAS	0.862
WATS	INTRA-PROVINCIAL	0.553
	INTER-PROVINCIAL	0.553
PRIVATE LINES - VOICE		
	CANADA - CANADA	0.512
SINGLE LINE BUSINESS RATE (COMPOSITE)		1.410

Source: D.A. Ford (1986), Exhibit 16: US - Canada Rate Ratios.

5.3.4 Local Rates

There is little incentive to bypass basic local services because, regardless of any price incentive to bypass, users require local access lines to originate or complete most local calls. Under present rate structures the incentive to bypass is more likely to be associated with specialized services such as cellular radio or specialized facilities (e.g. customized local channels). Users may desire their own local channel services for a number of reasons, including specialized technology, better service or lack of comparable telephone company facilities. Bell Canada has said that in certain locations local channel services could be vulnerable because the company averages its rates for local channels, thereby creating an opportunity for bypass in a particular location by using a lower-cost technology.

5.4 Opportunities For Bypass

5.4.1 Introduction

For bypass to have a significant impact on the revenues and, ultimately, on the rates charged by the telephone companies, users must have not only the incentive but also the opportunity to bypass. This section focusses on the opportunities for bypass that exist within Canada and internationally using customer-owned facilities (e.g. private microwave) or competitive systems. It also discusses current rules and regulations that restrict present opportunities for bypass.

5.4.2 Bypass within Canada

While the major concerns about bypass in the United States and Canada are similiar -- e.g. contribution erosion and impact on universal service -- there are important differences with respect to the manner in which bypass is accomplished. In the United States, all interexchange carriers make contributions to the local exchange telephone companies through charges levied on them based on the number of switched local-access lines used either to originate or terminate interexchange traffic. In general, the level of contribution received by local telephone companies is directly related to the number of switched access lines used for the origination or termination of long-distance

traffic. Under this arrangement, users and interexchange carriers can avoid contribution payments wherever facilities other than switched local- access lines are used to originate or terminate interexchange traffic. Such bypass can be accomplished by the use of private facilities (e.g. local microwave) or private lines (supplied by the telephone companies) used to connect customers directly to an interexchange carrier or reseller switch. This is referred to as "local bypass" in the United States, and it is considered by the local exchange telephone companies to constitute a serious threat to their revenues.

In Canada, on the other hand, the telephone companies provide both local and long-distance services and any contributions to local service are built into the price of long-distance services, with MTS/WATS providing the highest levels of contribution. In the absence of alternative MTS/WATS offerings, a customer attempting to avoid paying high levels of contribution has limited bypass options. Within Canada, if their traffic levels are high enough, customers can avail themselves of discounted telephone company long-distance services priced to recover lower levels of contribution or, where possible, similar competitive carrier services (such as those provided by CNCP).* However, for MTS/WATS traffic, unlike in the United States, there are no competitive service providers. Where customers wish to operate their own bypass facilities within Canada, they must invest in a long-distance network rather than a local facility in order to avoid contribution payments. Having made such an investment, Canadian customers still cannot legally interconnect these facilities (as opposed to the US facility bypasser who need only invest in short-haul facilities and can achieve interconnection through the facilities of an interexchange carrier).

Private microwave

Private microwave traditionally has been and continues to be one of the most prevalent technologies used for inter-city bypass in Canada and the United States. As pointed out in section 5.5, microwave systems are employed by a variety of large users, including governments, utilities, railroads and cable television operators, to meet many of their internal communication requirements.

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* In Bell and B.C. Tel territory, CNCP is required to provide contribution for its access to the local exchange.

It should be noted that these systems are not only used for traditional voice and data traffic, but also for specialized communications (e.g. energy system control and monitoring, and television programming). Moreover, private microwave systems may be operated by users in remote locations where telephone company facilities are not readily available.

At present, private microwave has had a limited impact on telephone company rates in Canada for a number of reasons. First of all, existing systems have often been in place long enough to be accounted for in telephone company investment decisions. Secondly, Department of Communications (DOC) licensing policy limits the number of licensed systems to prevent uneconomic duplication of telephone company facilities. Thirdly, as a general licensing policy, private microwave systems cannot sell capacity to the general public. Finally, private microwave systems are generally restricted from interconnecting to the public switched network.

During the CRTC Interexchange Competition proceeding, both Bell Canada and B.C. Tel agreed with the proposition that for private inter-city microwave to increase as a bypass threat there would have to be: (a) an increase in the number of systems licensed, (b) removal of restrictions on the sale of excess capacity or (c) the interconnection of present systems.[7] Microwave licensing policy is presently being reassessed by the DOC. In addition, the Nielsen Task Force has suggested that consideration be given to the development of alternative spectrum-management policies aimed at facilitating greater network competition.[8]

Due to the uncertainty over future microwave licensing policy, it is difficult to assess the potential impact of microwave networks on telephone company rates. The extent of any impact on rates in a more liberalized environment would, however, vary according to a number of factors, including the ability to interconnect and resell capacity, the speed with which growth in long-distance traffic would offset any stranded investment, the level of compensation for interconnection and the number of users with sufficient traffic volume to justify the cost of owning and operating an inter-city network.

With respect to local service, the opportunity for bypass (e.g. using 18 or 23 GHz systems) is limited by the DOC microwave licensing policy presently under review and by restrictions on interconnection. In federally-regulated telephone company territory, users who can acquire facilities may construct and operate private local networks. Such facilities would be used to connect

multiple locations within a given exchange in lieu of telephone company local-channel service. Even in this situation, however, the telephone companies would remain the sole providers of local access trunks.

Cellular radio

While cellular radio is primarily a local bypass phenomenon, a cellular operator could, as MT&T points out,[9] offer its own interexchange network, thus permitting its customers to bypass -- particularly on high density routes. At this time, it is unlikely that cellular providers pose a significant threat given the high level of terminal and air-time costs and the relatively small number of subscribers. Bell expressed this opinion during the CRTC Interexchange Competition proceeding.[10] In the long run, cellular radio would increase as a bypass threat if it provided fixed-station-to-fixed-station inter-city service or connected other-service providers through its switch into the public-switched telephone network. However, this would require a change in current regulatory policies which prohibit this type of system interconnection. Presently, cellular radio is not considered an economic substitute for basic local service, but instead is regarded as a substitute for conventional mobile-telephone service. In the long run, however, it is conceivable that cellular radio service could provide a viable alternative to local loop distribution.

Fibre optics

With its high capacity and declining costs, fibre optic cable has become a very attractive inter-city transmission medium for telephone companies. Development of fibre optic networks in Canada, outside of those being established by telephone companies, has so far been limited to that of CN, CNCP and certain power utility companies.* The development of fibre optic networks in Canada is

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* The CN/CNCP fibre-optic network will link Montreal, Ottawa and Toronto in the East and Edmonton and Vancouver in the West. The cost of 1 210 miles of cable along CN's right of way will be approximately $100 million. It will be used for CN's internal requirements (voice, data, dispatch and train identification) and CNCP's competitive network services. CNCP is also considering plans for expansion of its network in the Windsor-Quebec corridor, and possibly between Edmonton (or Calgary) and Toronto (see Telephony 17 February 1986, p.42-51).

restricted by a number of factors. First, fibre optic cable requires rights of way. Second, without interconnection the saleability of capacity on such systems is very limited. While railways, utilities and pipelines may possess rights of way, there is no indication that many of these parties presently possess sufficient internal capacity demands to justify the expense involved in developing such networks.

In the local exchange, fibre optic cable is expected to be used primarily within buildings in local area networks for business computer communications. While it has a potential to substitute for local channel services, this application is limited by restrictions on interconnection to other than federally-regulated telephone companies and by the high costs involved in acquiring suitable rights of way within local exchanges.

Cable Television Networks

While cable television (CATV) systems possess extensive broadband intra-city distribution networks and some inter-city microwave facilities, there is little indication that operators of these systems intend to enter either the basic voice or data telecommunication markets. On 29 October 1985, Michael Hindsmith, President of the Canadian Cable Television Association, stated at a CRTC Public Hearing on non-programming services, that none of his members wished to be in the telephone company business.[11]

Thus, while CATV companies have expressed interest in specialized data and enhanced non-programming services, most systems do not have the requisite interactive facilities to offer bidirectional services. Even in the United States, where cable systems could be used to offload inter-city traffic, the impact of CATV systems has been minimal.

Given present technical capacity and restrictions on the interconnection of interexchange traffic, it is unlikely that CATV systems will have any impact on basic local or long-distance revenues in the next few years. To the extent that cable systems begin to provide bidirectional non-programming services, these can be viewed as alternatives to telephone company enhanced services. However, the market for non-programming services at this time is virtually non-existent.

Satellites

The bypass potential of satellite technology for Canada-Canada traffic is difficult to predict due to recent changes to the structure of this market. The three most significant changes are: (1) liberalization of the Department of Communication (DOC) earth-station ownership policy permitting users to own and operate their own transmit and receive earth stations; (2) the revised Telecom Canada/Telesat Connecting Agreement which allows Telesat to provide services directly to end users (in certain jurisdictions); and (3) Telecom Decision CRTC 85-19 permitting the resale of Telesat services to provide non-MTS/WATS interexchange services.

In assessing the impact of these changes on telephone company rates, a number of factors must be considered and some specific issues resolved. For instance:

1. Telesat's reported marketing strategy[12] would seem to indicate that the company wishes to focus on markets not economically provided by terrestrial carriers (multipoint transaction networks and remote monitoring and control) rather than on direct competition with established private line services. This could change, however.

2. Resale of satellite services to provide non-MTS/WATS interexchange services may be limited by: (a) current DOC policy limiting the use of microwave and satellite facilities by third parties; (b) restrictions on interconnection to telephone companies under provincial jurisdiction; and (c) the terms and conditions of interconnection (including compensation) to the networks of federally-regulated telephone companies.

3. For users with private networks connected to their own earth stations, it is yet unclear whether DOC and/or regulatory policy will permit the interconnection of such systems.

CNCP, B.C. Rail and resale

In the territories of the federally-regulated telephone companies, varying degrees of interconnected private-line voice and data service competition

have been permitted. To this point, the activities of CNCP in this market have had no serious impact on Bell or B.C. Tel rates.* The CRTC does not consider private line resale a serious threat to telephone company revenues given the prohibition on resale to provide MTS/WATS equivalent service and the opportunity provided to federally-regulated telephone companies to adjust their private line rates in anticipation of resale. In permitting B.C. Rail to provide interconnected private line service in British Columbia, the CRTC also found that there would be no adverse economic impact on B.C. Tel.**

5.4.3 International Bypass

There are a variety of traffic configurations whereby a customer could obtain bypass alternatives for Canada-Canada, Canada-US and Canada-overseas traffic. Among these situations are the following:

1. A Canadian customer dials long-distance to a reseller's switch (located in the United States, usually close to the Canadian-US border), receives a second dial tone and dials to extend the call to another Canadian, US or overseas destination.

2. A reseller in the United States buys foreign exchange (FX) service to Canada, terminating on a switch with a local Canadian telephone number. A Canadian customer then dials a local number and the call is extended to the US reseller's switch for carriage to points in Canada, the US or overseas.

3. Alternatively, a Canadian customer can buy a tie line or US FX service to reach either a US reseller's or a US telephone company's switch, thereby gaining access to points in Canada, the US or overseas.

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* For the year ending 30 August 1985, CNCP revenues from interconnected interexchange services were approximately $12.5 and $1.5 million, respectively, for Bell and B.C. Tel territory.

** B.C. Rail is required to make contributions towards the cost of B.C. Tel's local exchange facilities.

4. Bypass of Canadian interexchange facilities may also be achieved through the use of private line facilities in the United States. A Canadian customer can gain access to these private line facilities through the use of a Canadian telephone company's facilities or through the provision of his or her own facilities (e.g. microwave). Through such a configuration, customers can bypass Canada-Canada and Canada-US MTS and private line services.

5. Bypass of Canada-Canada, Canada-US or Canada-overseas services can also be achieved through the use of a US satellite with earth stations located either in Canada or in the United States close to the Canada-US border, where access is achieved through the use of Canadian telephone company facilities or facilities provided by the customer.

British Columbia Telephone has noted a number of restrictions presently in place that are intended to preclude the implementation of much international bypass. These include: (a) Telecom Canada agreements with US carriers (MCI, SBS, GTE-Sprint and AT&T) regarding international traffic and prohibiting the carriage of Canadian domestic traffic; (b) Telesat Canada/US Domsat umbrella-sharing agreements governing the provision of satellite cross-border services (in B.C. Tel's view, these agreements may not be binding with respect to resellers); and (c) agreements with Teleglobe Canada that limit Canadian originating or terminating traffic with countries other than the US to Teleglobe gateways.

The D.A. Ford study referred to earlier sets out a number of technical configurations similar to those just outlined that would permit customers to engage in international bypass of Canada-Canada, Canada-US and Canada-overseas traffic. The study also discusses some factors that reduce the chances of bypass occurring on an extensive basis. (See section 5.3.3.)

5.5 Incidence of Uneconomic Bypass

5.5.1 Introduction

This section considers examples of bypass listed by the telephone companies in response to requests for information made during this examination as well as during the CRTC Interexchange Competition proceeding. Subsection 5.5.3

includes the findings of the D.A. Ford study with respect to bypass through the United States.

5.5.2 Bypass within Canada

Alberta Government Telephones

AGT notes several (unidentified) forms of non-interconnected systems employed by large organizations for voice and data transmission. These include point-to-point radio, satellite and hard wire systems. AGT predicts that cellular providers may build significant intra- and inter-city networks for mobile calls, and that these providers may widen their service base beyond voice. AGT gives two examples of local microwave systems in its operating territory. AGT also notes that, given wide bandwidth capacity, CATV systems could provide significant bypass networks in the future.

Bell Canada

While Bell focusses on facility bypass, it notes that customer bypass using services of non-regulated competitors, resellers of Canadian telephone company facilities and regulated competitors (CNCP) results in the erosion of the company's revenues. Bell cites microwave, domestic satellite, fibre optics and cellular radio as the most commonly available technologies that could be used for bypass. Since the company does not have access to records for all bypass facilities and services, however, it cannot accurately identify the full extent of bypass. Included in the examples of which it is aware are: (a) Ontario Hydro, Hydro Québec and Alcan (private microwave carrying data and limited voice); (b) Rogers Cable Systems, CUC Ltd. and Ottawa Cablevision (private microwave for program transmission); and (c) Consumers Gas, Time Communications, the Ontario Dept. of Transportation and Communications, and the Ontario and Quebec provincial police (examples of point-to-point UHF and VHF-radio dispatch systems). During the CRTC Interexchange Competition proceeding, Bell noted that the DOC's liberalized earth-station policy and potential liberalization of microwave licensing policy could cause further revenue erosion.

In that proceeding, Bell noted six examples of local bypass in its operating territory: (1) McMaster-Chedkoke Hospital (private microwave system);

(2) Videotron (high-speed data channel); (3) Rogers Cable (traffic light control system, Brampton, and private stockbroker channel, Toronto); (4) Ciba-Geigy (private data via underground cable); (5) Toronto Wellesley Hospital (multipair cables connecting buildings); and (6) Sudbury Hydro (multipair cables connecting buildings). Bell suggests that Telecom Decision CRTC 85-19 will allow an increase in private voice and data and public data systems. In addition, Telecom Decision CRTC 84-18 regarding enhanced services will permit an increase in local systems interconnection.

British Columbia Telephone

With regard to existing bypass networks, B.C. Tel identified the following: (a) the B.C. Hydro microwave network used for control of dam sites, power generation and transmission; (b) railroad trackside and train control systems providing coverage in underserved locations; and (c) CATV inter-city microwave for inter-city transmission. Regarding more conventional forms of bypass, B.C. Tel mentions: (1) the Long Distance Access Corporation which proposes to offer long-distance service in British Columbia in conjunction with Skyswitch, a reseller of satellite transponder capacity; (2) B.C. Rail, an interconnected private-line and data service competitor; and (3) Cantel, which is authorized to provide inter-city service for cellular telephones and which, according to B.C. Tel, has stated its intention to become an MTS provider. B.C. Tel also notes that technological advances like multiplexing and customer control of private branch exchanges (PBXs) may increase the incidence of bypass.

Manitoba Telephone System

Of the existing or potential bypass systems of which it is aware, Manitoba Telephone System notes: (a) private microwave facilities; (b) CNCP facilities in select locations (microwave and wire); (c) the capability of Telesat to serve Manitoba locations; and (d) local microwave and private line facilities in Winnipeg.

Maritime Telegraph and Telephone

MT&T is aware of several instances where customer-owned networks provide for communication needs. These include: the NS Power Corporation for

remote surveillance, monitoring and control of generating plants; the NS Dept. of Lands and Forests' use of VHF repeaters in trunked microwave facilities providing province-wide coverage; and applications by CNR and CNCP. MT&T considers that future bypass could occur using cellular radio, cable TV services, and in relation to on-going improvements in technology.

New Brunswick Telephone

NBTel is aware of several customers who have constructed private microwave systems for data and voice communications. Despite the relatively low incidence of long-distance bypass, NBTel is concerned about the impact on the Revenue Settlement Plan due to bypass in other jurisdictions.

Newfoundland Telephone

Newfoundland Telephone was not aware of any bypass of either its local or long-distance network, but it expressed concern regarding potential bypass by satellite.

NorthwesTel

NorthwesTel noted the following bypass systems: (1) B.C. Rail microwave between Dawson Creek and Fort Nelson; (2) satellite earth stations utilized by B.C. Tel and SED Systems Inc.; and (3) satellite distribution of television and radio programming. NorthwesTel also noted potential bypass as a result of the DOC's liberalized earth-station policy. The company noted that restrictions on the interconnection of customer-owned earth stations reduces the incentive to develop such systems. With no competitive entry, NorthwesTel estimated the revenue impacts by 1995 of customer-owned or shared earth stations and private radio, including microwave, to be $4.1 million and $1 million, respectively.

Québec-Téléphone

Québec-Tél identified services offered by CNCP, Hydro Québec's microwave network and customer-owned earth stations as the most prevalent forms of existing or potential bypass.

Saskatchewan Telecommunications

SaskTel identified the primary form of existing bypass to be that of services such as Datapac and Dataroute by customers using competitive carriers (e.g. CNCP). In addition, SaskTel indicated a limited number of applications where businesses employ private microwave for voice, data or video traffic, and two businesses using satellite-based systems to accommodate their specific communication requirements. SaskTel noted less than ten applications of local bypass for alarm, control, telemetry and voice/data services.

Télébec Ltée

Télébec noted several examples of actual or potential bypass: (1) the Hydro Québec network as an example of microwave bypass; (2) CNCP's extensive network; (3) the potential for cable systems to divert inter-city traffic and provide local services; (4) the potential for satellite systems; and (5) potential competition from cellular radio and conventional mobile radio systems.

Terra Nova Telecommunications

With regard to existing bypass systems, Terra Nova Tel noted: (a) microwave systems of the RCMP, Newfoundland and Labrador Hydro, Newfoundland Light and Power and the provincial Department of Forestry; and (b) some television services distributed via satellite. In addition, it noted other potential systems, including radio common carrier systems, customer-owned radio systems and customer-owned earth stations. Terra Nova Tel also noted that the DOC's liberalized earth-station policy may lead to increased use of satellite facilities to bypass. During the CRTC Interexchange Competition proceeding, the company predicted the impact of customer-owned or shared earth stations to be less than $1 million by 1995, assuming no competitive entry.

5.5.3 International Bypass

Bell Canada

Examples of international bypass of which Bell was aware included: (a) customers leasing Bell tie lines to connect to the long-distance network of NC CORP, Buffalo; (b) market trials in 1985 by American International Telecommunications for cross-border resale; and (c) Textran Technologies providing message service bypass.

British Columbia Telephone

In its responses, B.C. Tel noted that bypass of Canada-Canada, Canada-US (e.g. Camnet and Longnet) and Canada-overseas facilities is currently occurring via cross-border resale. Moreover, cross-border resellers who attempted to obtain CNCP FX access to the United States with Vancouver or Victoria free-calling area telephone numbers, are expected to reapply for service following approval of private-line sharing and resale tariffs.

D.A. Ford

The D.A. Ford study (1986) estimated the annual revenue impact of international bypass to be $1.5 million lost to Canadian telephone companies as a result of cross-border resale and $3.1 million lost to discount telex providers (e.g. $1.5 million from Teleglobe and $1.6 million from CNCP). The study noted that no estimates were possible to account for revenue losses attributed to users off-ending traffic into local exchanges in the United States and using private lines or private networks or due to the use of "dummy nodes" to avoid private line costs associated with border-crossing policies established by Canadian and US telecommunication companies.

5.6 Conclusion

Bypass involves the selection by customers of alternatives to some or all of the local or long-distance services provided by the telephone companies over facilities used by the general public to send ordinary voice/data telephone

calls. Bypass of some or all long-distance services to reduce costs is considered a major, but not the exclusive, reason for selecting alternative services or facilities. Bypass can be accomplished utilizing a variety of technologies and may involve the use of customer-owned facilities (facility bypass) competitive services (carrier bypass) or alternative telephone company services (service bypass).

Uneconomic bypass is said to occur where services and facilities that have a higher cost than those of the telephone company are elected by a customer because the rates charged by the telephone company are held artificially high. Uneconomic bypass is extremely difficult to identify due to problems in isolating and comparing the costs of different technologies and systems over time. Moreover, users may decide to bypass for reasons other than price, such as service quality, availability and control. To the extent that the use of discounted telephone company services (e.g. private lines) can be considered a form of bypass, these alternative services constitute the greatest amount of bypass activity at the present time.

Due to a number of factors, the opportunities for and incidence of either carrier or facility bypass, especially in comparison with the US experience, are limited. These factors include:

- current inter-/intra-city microwave licensing and, until recently, earth-station ownership policies of the DOC;

- the absence of MTS/WATS competition and associated network access charges and, in many jurisdictions, other forms of interexchange competition;

- regulations relating to the interconnection of private interexchange networks;

- the availability of discounted telephone company services as an alternative for customers who might otherwise engage in facility or carrier bypass;

- current Canada-US exchange rates, cost of access to cross-border resellers and Canadian telecommunication policies governing

international bypass (The D.A. Ford study estimated the current annual revenue impact of international bypass to be $4.6 million.);

- lack of viable alternatives for basic local telephone services; and
- regulatory restrictions, except in federally-regulated territories, on the interconnection of private local networks.

While the above reasons provide a rationale for the limited extent of bypass to this point, they also indicate how fragile the barriers to bypass may be. Note the following examples:

1. A reduction in exchange rate differentials towards par could create large positive financial incentives to utilize cross-border resale.

2. Increased liberalization of microwave licensing could contribute to an erosion of interexchange service and local channel revenues.

3. While a restructuring of rates may reduce incentives for long-distance bypass, it may actually increase incentives for bypass of some local services, particularly local channel services.

4. The interconnection of satellite earth stations, if and where permitted, may contribute to an erosion of telephone company private-line revenues.

5. Customer control of PBXs, coupled with a greater awareness of opportunities to bypass, could increase the incidence of customer interconnection of prohibited networks through a PBX into the public-switched telephone network.

CHAPTER 5

ENDNOTES

1. Bethesda Research Institute, "Study of Local Bypass: Final Survey Results," June 1984: p.7.

2. Bethesda Research Institute, "Local Bypass In New Jersey: Survey Results and Implications," December 1984: p.21.

3. D.A. Ford, "The Impact of International Competition on the Canadian Telecommunications Industry and Its Users." Report commissioned by the Department of Communications and provincial governments, Draft Report, April 1986: p.32.

4. Ibid: p.28.

5. Future Systems Inc., "Transmission Cost Comparison For Satellite, Fibre Optics and Microwave Radio Communications," Report No.120, cited in Telecommunications, June 1984: p.47

6. Note 3, supra: p.3

7. Canadian Radio-television and Telecommunications Commission, Interexchange Competition and Related Issues, Transcript of Proceedings, No.14, 18 October 1984: p.2827; and No.23, 5 November 1984: p.4894-5.

8. "Management of Government Regulatory Programs," A Study Team Report to the Task Force on Program Review. Released 13 February 1986: p.184.

9. Maritime Telegraph and Telephone, Response to information request MTT(CRTC) 19Feb86-38FP, Federal/Provincial Examination of Telecommunications Pricing and Universality.

10. Bell Canada, Response to interrogatory Bell(CRTC)22May84-500(3)IC, CRTC Interexchange Competition proceeding.

11. Canadian Radio-television and Telecommunications Commission, Review of Non-Programming Services and Cable Advertising, Transcript of Proceedings, No.1, 29 October 1985: p.64

12. Globe and Mail, 6 March 1986: p.C-15.

CHAPTER 6

Effects of Current and Alternative Rate Structures on Fostering Effective Use of the Public Telecommunications Network

CHAPTER 6

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6.1 Introduction

This paper examines the effects of current and alternative local and long-distance rates on fostering effective use of the public telecommunications network. For this purpose, the term "effective use" may be taken to involve two components. First, where the resulting cost savings exceed any loss of value to customers from shifting such traffic, traffic should be shifted from peak to off-peak periods. Second, levels of off-peak calling should be encouraged where its value exceeds cost, and peak calling should be discouraged where costs exceed value. Achieving a traffic pattern that was completely flat across all daily time periods would, of course, be impractical and could involve benefit reductions in excess of any cost savings. It would not, for instance, generally be practical to attempt to utilize fully local network capacity during the night-time hours. However, a rate design that encourages a more even distribution of calling than at present could result in more effective use of the public telephone network. Effective use can also be defined to involve the effective utilization of network capabilities to provide new services to the public and new revenues for the industry.

In examining these issues, this chapter first describes existing local and long-distance traffic patterns. It then briefly reviews evidence as to the feasibility of using rate designs to alter telephone traffic patterns. Finally, it notes certain other means of promoting effective utilization of network capabilities.

6.2 Local and Long-Distance Traffic Characteristics

6.2.1 Data Gathering and Description

In response to requests made in the course of this examination, a number of telephone companies provided information regarding the variation of traffic volumes over time for Class 5 and Class 4 switches.* Information was

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* Class 5 switches generally carry local traffic but will also switch calls for customers dialing long-distance. The amount of switched long-distance traffic was not provided in all cases, but is small relative to local traffic. Class 4 switches usually carry long-distance traffic from a Class 5 office but can also carry some local traffic. The volume of local traffic is dependent on the particular office used.

provided, as available, for urban, suburban and rural locations* during the companies' busy month for 1984 and 1985, for typical business and non-business days.

The mixture of business and residential traffic volumes was not generally provided. (An examination of the individual exchanges would provide some information on the mix.) One company indicated that the variations in traffic volume over time for Class 5 offices were probably influenced more by the mix of residential and business subscribers than by the type of switch.

6.2.2 Data Analysis

a) Local traffic patterns (Class 5 switches)

Appendix A summarizes local traffic data (from Class 5 switches) submitted by the telephone companies. In describing these traffic patterns, the term "peaks" is used to refer to the highest traffic volume for a one-hour period relative to adjacent hours. "Shoulders" refers to the one or more hour periods surrounding the peaks.

Bell Canada and Saskatchewan Telecommunications provided traffic volume information for their busy periods for 1984 and 1985. New Brunswick Telephone provided 1985 busy season results. Manitoba Telephone System and Télébec provided a study for one point in time.** British Columbia Telephone's study was based on a "typical" hour-of-day distribution of local usage taken from a May 1983 report. Newfoundland Tel provided information on a daily basis for the busy month. Manitoba Telephone System was the only company that provided non-business day traffic statistics (Saturday and Sunday). Other companies either did not have studies available or provided information on a confidential basis only. An example of urban, suburban and rural local traffic patterns is presented in Figure 6.1.

In general, the largest daily peaks occurred in the 10:00 - 11:00 a.m. or 11:00 a.m. - noon period for urban centres. A high shoulder in the immediately preceding and/or following one-hour period was common. Another peak

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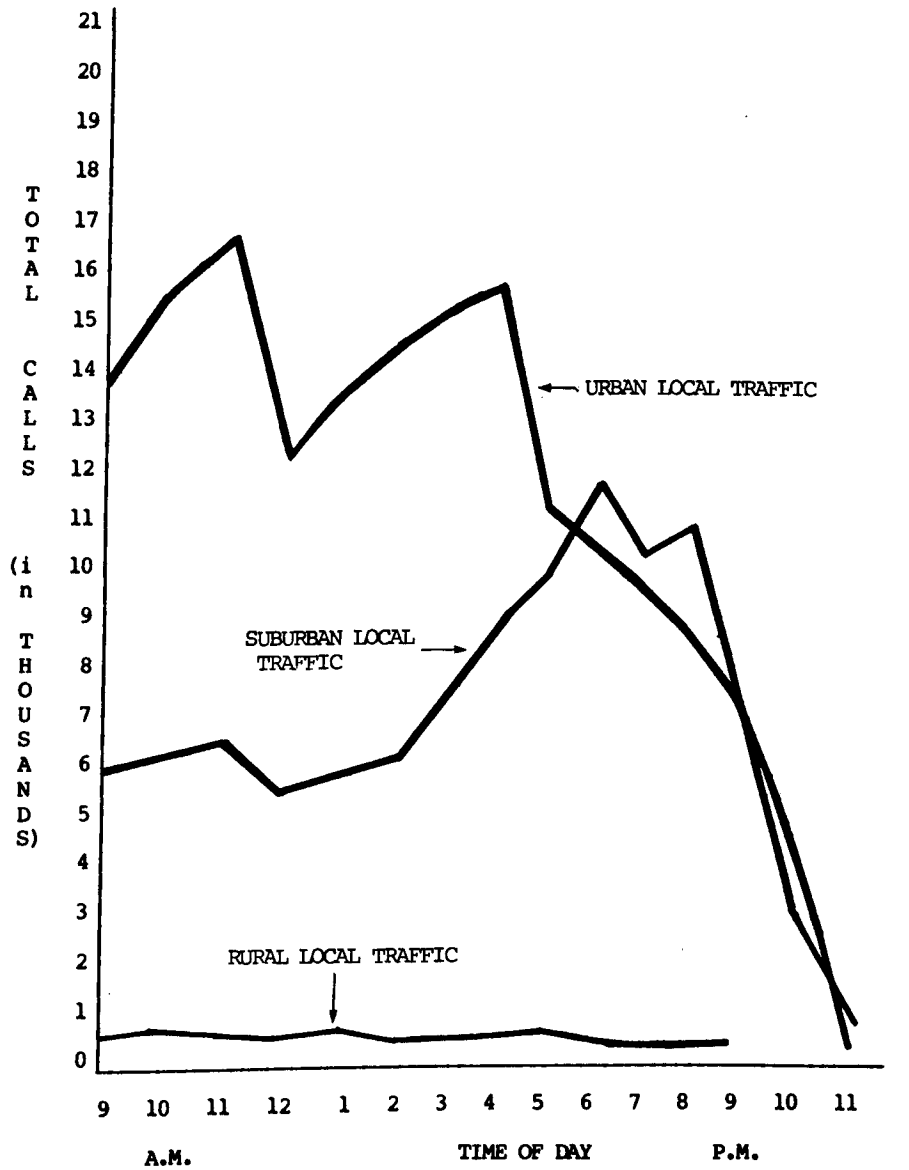
* The classifications urban, suburban and rural varied in interpretation and were not defined by the companies. In all cases, however, the geographic areas used were listed.

** In cases where single-period studies were used, the results may not be typical of actual busy periods.

FIGURE 6.1
Time-of-Day Local Telephone
Traffic Variation (NBTel)



of almost equal magnitude occurred in the 3:00 - 4:00 p.m. period. Immediately preceding or following it, high shoulders again were common. In some areas, a third peak was observed in the 7:00 - 8:00 p.m. period. There was little variation in comparing 1984 to 1985 data. In the case of SaskTel, the largest peak occurred in the 7:00 - 8:00 p.m. period followed by the 5:00 - 6:00 p.m. and noon - 1:00 p.m. periods.

Suburban centres generally had the largest peak in the 7:00 - 8:00 p.m. period, with sharply sloped shoulders in the immediately preceding and/or following one-hour periods. SaskTel and Manitoba Telephone System had their highest peaks in the 5:00 - 6:00 p.m. period (although SaskTel had their highest peak in the 7:00 - 8:00 p.m. period in 1985), followed by the 7:00 - 8:00 p.m. period. Second or third peaks occurred in the morning: in the 10:00 - 11:00 a.m. or the 11:00 a.m. - noon period. The shoulders for these periods were flatter than those in the evening periods.

Rural centres had the largest peak at various periods throughout the day. The results were inconsistent across Canada. Bell Canada results for four rural exchanges showed their highest peaks in the late afternoon or early evening (4:00 - 5:00 p.m. and 7:00 - 8:00 p.m.). Manitoba Telephone System results showed an 11:00 a.m. - noon peak followed by an 8:00 - 9:00 p.m. peak. NBTel had many peaks, the highest of which was in the 10:00 - 11:00 a.m. period. SaskTel had peaks at 9:00 - 10:00 a.m. and then at 6:00 - 7:00 p.m. The shoulders for each of the companies varied. Some were sharply sloped while others were virtually flat.

The Manitoba Telephone System non-business day traffic volume data provided were for a Saturday and Sunday in March 1986. Urban office traffic volume was relatively low on Saturdays, with a small peak in the noon - 1:00 p.m. period. Sunday traffic volume was very low. Suburban traffic volume for a Saturday was comparable to business day traffic volumes. A sharp peak occurred in the noon - 1:00 p.m. period and again in the 7:00 - 8:00 p.m. period. Sunday traffic volume was lighter than Saturday, with a peak in the 1:00 - 2:00 p.m. period and a minor peak in the 8:00 - 9:00 p.m. period.

Rural traffic volume for a Saturday was higher than traffic volume for a business day during some of the period sampled. A peak occurred in the noon - 1:00 p.m. period followed by a similar peak in the 8:00 - 9:00 p.m. period. Traffic volume for Sunday was much lower than for Saturday, with a sharp 9:00 - 10:00 p.m. peak and a smaller 11:00 a.m. - noon peak.

b) Long-distance traffic patterns (Class 4 switches)

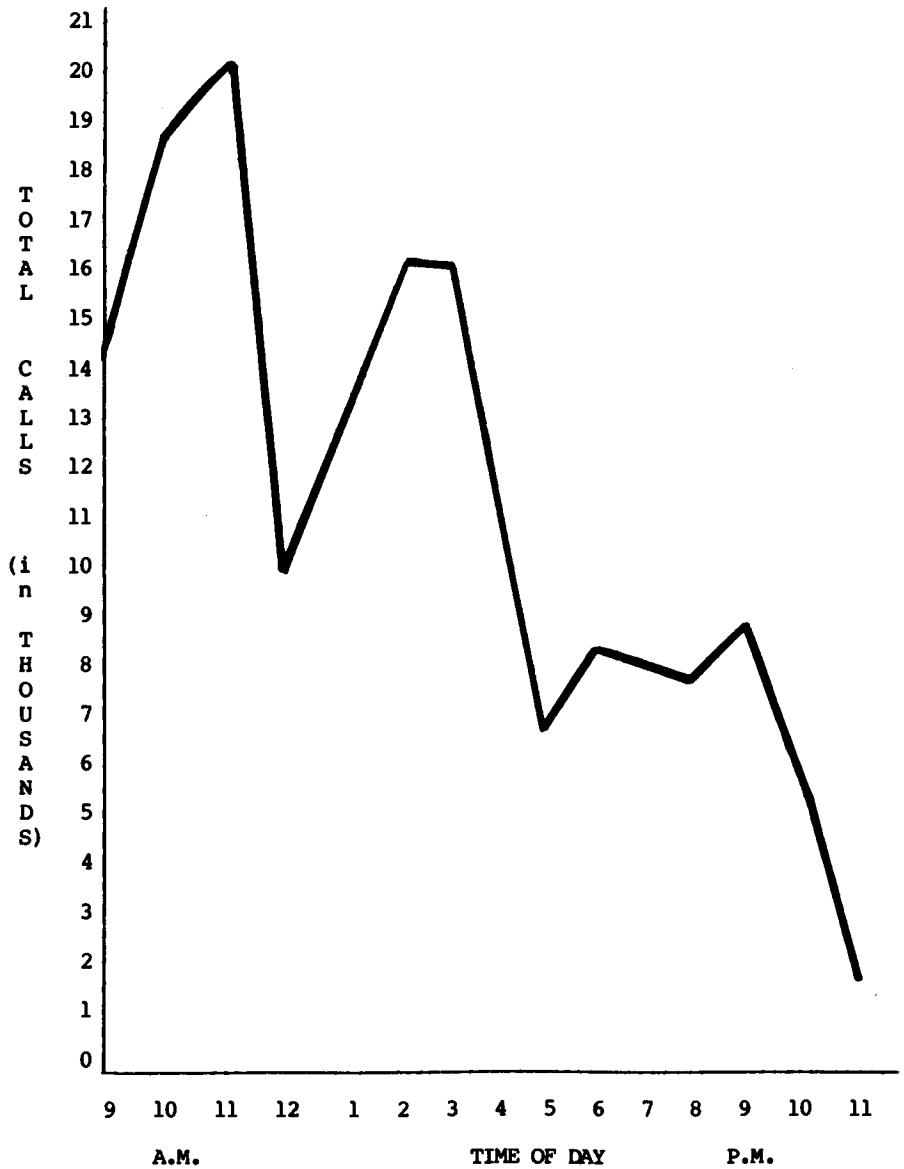
Appendix B presents long-distance traffic patterns for Class 4 switches based on data submitted by the telephone companies.

Bell Canada, and B.C. Tel provided traffic volume studies for their busy periods in 1984 and 1985. NBTel and AGT provided 1985 busy season results. Manitoba Telephone System, Télébec and NorthwesTel provided a study for one point in time. Newfoundland Tel provided information on a daily basis only for their busy month. Manitoba Telephone System, B.C. Tel and Télébec provided information on non-business day traffic. Other companies either did not have studies available or provided them on a confidential basis only.

An example of urban long-distance traffic is presented in Figure 6.2. In general, the largest daily peaks occurred in the 10:00 - 11:00 a.m. or 11:00 a.m. - noon period for urban centres. B.C. Tel had their highest peak in the 7:00 - 8:00 p.m. period, while NorthwesTel had their highest peak in the 8:00 - 9:00 p.m. period. The shoulders after the morning peak were quite steep but sloped gradually prior to the peak period. The next largest peak occurred in the afternoon, in either the 2:00 - 3:00 p.m. or 3:00 - 4:00 p.m. periods, except for B.C. Tel and NorthwesTel, where the second peaks were in the 10:00 - 11:00 a.m. period (9:00 - 10:00 a.m. in 1985 for B.C. Tel). The afternoon shoulders were similar to those in the morning, but they were less steeply sloped in the periods following the peak period. The third peak occurred in the evening period at either 7:00 - 8:00 p.m. or 9:00 - 10:00 p.m. B.C. Tel and NorthwesTel had peaks in the 1:00 - 2:00 p.m. period (2:00 - 3:00 p.m. for the urban/rural switch) and the 3:00 - 4:00 p.m. period, respectively. The shoulders surrounding the evening peaks were of medium slope. There was no flat shoulder preceding the peak as was seen with the morning and afternoon peaks.

The suburban switch in the Bell Canada study showed a traffic peak in the 7:00 - 8:00 p.m. period. The shoulders immediately preceding and following the peak were almost identical to the peak. The next peak of nearly equal magnitude was the morning period from 10:00 - 11:00 a.m. The shoulders surrounding this period were of equal magnitude, creating a long morning peak period from 9:00 a.m. to noon. An afternoon peak occurred in the 3:00 - 4:00 p.m. period. The shoulders were gradually sloping. The rural centre appeared to have little in the way of traffic volume variation. The AGT switch for which data were provided carried traffic for all three types of

FIGURE 6.2
Time-of-Day Long-Distance
Traffic Variation (NBTel - Saint John)



classification (urban, suburban and rural), but it is hypothesized that the switch might be a "typical" suburban one because of the size of the community involved. The largest daily peak occurred in the 9:00 - 10:00 a.m. period, and the shoulder following the peak was gradual. The next peak occurred in the 8:00 - 9:00 p.m. period, with shoulders on either side almost identical in size. The third peak was in the afternoon, at 2:00 - 3:00 p.m. The shoulders there were also fairly flat. It would appear that in the case of AGT, an attempt to redistribute traffic from the peak periods would result in new peaks in the shoulder periods.

Manitoba Telephone System, B.C. Tel and Télébec provided information on non-business day traffic. Saturday traffic volume was highest between 11:00 a.m. and noon for Manitoba Telephone System, with an evening peak in the 9:00 - 10:00 p.m. period. Sunday traffic was highest in the 1:00 - 2:00 p.m. period, with an evening peak in the 7:00 - 8:00 p.m. period. Shoulders surrounding the peaks for weekend traffic were very gradually sloped. B.C. Tel had their highest weekend traffic volume in the 7:00 - 8:00 p.m. period, followed by the 10:00 - 11:00 p.m. period. Télébec had their highest weekend traffic volume in the 1:00 - 2:00 p.m. period, followed by the 7:00 - 8:00 p.m. period.

6.3 Pricing to Achieve Effective Use

6.3.1 General Discussion

In general, in urban areas the network appears to be operating at or near capacity during the hours of 10:00 a.m. to noon and 2:00 p.m. to 5:00 p.m. on business days. In suburban areas, some companies have experienced two or three hours of heavy traffic from 7:00 p.m., while others have found peak loads as early as 6:00 p.m.

As the network has been designed to carry all traffic during the busy hours of an average business day, there is considerable unused capacity outside the busy periods. To achieve effective use of the network, rates can be designed to level the peaks and redistribute the timing of traffic volume so that less capacity is required to serve the peak loads and the network is better utilized during "off-peak" hours. Such capacity levelling could lead to a reduction in construction costs, plant investment and the rate base. Consequently, telephone subscribers could benefit from lower rates than would otherwise be the case.

The current picture of uneconomic use of the network is partly reflected in a network analysis study by Bell Canada conducted in 1982.[1] Bell found that while the network is heavily congested in busy morning periods, between midnight and 9:00 a.m. it is possible to handle 100 per cent more long-distance traffic than is currently provided. The study also found that additional long-distance traffic (up to 50 per cent more) could be accommodated Monday through Friday between the hours of noon - 2:00 p.m. and 5:00 - 6:00 p.m., but that evening hours from 6:00 p.m. - midnight are heavily blocked during week nights as a result of the existing price discounts.

The present flat-rate pricing scheme for local service does not influence either the timing or the volume of local traffic. However, current discounts for long-distance calls made in the evening, late night, early morning and weekends may be redesigned to change the existing time-of-day long-distance calling patterns so that increased traffic can be accommodated at present network capacity levels. A measured-rate alternative might be able to reduce the pressure of high volumes of local traffic on the network during the mid-morning hours.

Both discount pricing and measured-rate pricing to achieve more effective use of the network will be discussed in more detail in the following sections.

6.3.2 Discount Pricing

Perhaps the most important use of discount pricing is to shift long-distance calls from a peak to an off-peak time. Discounts may also serve to stimulate new calls or to increase calling minutes during the off-peak period. Moving prices closer to costs via discount programs would result in capital resources being used more efficiently in off-peak periods. At the same time, the reduction of long-distance traffic in peak periods would reduce traffic-sensitive costs such as the level of inter-city trunks and Class 4 switch capacity. This would result in a smaller rate base and lower rate levels than would otherwise be the case.

The potential success of a time-of-day discount pricing scheme depends on the type of customers the network serves. Discounts usually appeal to those users who are most likely to respond to lower prices by increasing and/or shifting their calling patterns. Business calling, by its nature, would tend to

be much less flexible in this respect than residential calling. However, although the demand for residential calling may be relatively more flexible between hours, a considerable number of residential calls made during peak hours are to businesses and thus may not be easily shifted. Nonetheless, it would appear that a program to shift calling patterns of residential customers would have a greater chance of success.

An article by Myron L. Lambert[2] presents some empirical load study results which suggest that the wide area telephone service (WATS) peak and off-peak rate structure implemented by AT&T in 1981 has not been effective in levelling either the WATS traffic peak load or the overall traffic load on the inter-state network in the United States. Two reasons for the unsuccessful application of peak and off-peak rates are suggested. First, the relatively low aggregate-price elasticities for WATS provided a hint that the services would not respond to a peak and off-peak rate structure. Secondly, since WATS is primarily a business day service, it is not surprising that there was no significant shift of WATS traffic outside of the 8 a.m. to 5 p.m. period via a lower price incentive. The article concluded that for successful peak and off-peak rate applications, there must be some discrete cross elasticity between rate periods.

Notwithstanding the failure of the above discount WATS program to change the time-of-day network load distribution, message toll service (MTS) peak and off-peak discounts have been quite successful in inducing off-peak MTS usage in the United States. In fact, in 1982 the evening peak usage for MTS exceeded daytime MTS peaks. Research suggests that this is in large measure attributable to residential calling in response to off-peak discounts. There are few studies in Canada that assess changes in the overall time-of-day network load distribution as a result of either discount rate or discount period changes.

In response to CRTC interrogatory BELL/BCTel(CRTC)04Feb80-219, Bell Canada and British Columbia Telephone submitted a study examining the revenue and traffic impacts of changing the start-time of discount periods of the Telecom Canada long-distance schedule. Two of the options examined were: (a) maintaining rate levels then in effect but changing the start-time of evening discounts from 6:00 p.m. to 5:00 p.m. and (b) changing the start-time of late-night discounts from midnight to 11:00 p.m. To estimate consumer response to changing the evening discount start-time to 5:00 p.m., the study, using 1976 as the test year, analysed long-distance traffic volume distribution in five-minute intervals

between 4:00 and 7:00 p.m. It concluded that there would be minimal shifting of traffic from the 4:00 - 5:00 p.m. period into the 5:00 - 6:00 p.m. period because business calling began to decline rapidly after 4:00 p.m. and residential calling from 4:00 - 6:00 p.m. was very low.

Assessments of the traffic impact of changing the start-time of the deep discount period from midnight to 11:00 p.m. were more positive. The study also examined message distributions between 10:00 p.m. and 1:00 a.m. by five-minute intervals. It estimated that there would be a shift of 12 per cent of messages from the 10:00 - 11:00 p.m. period into the 11:00 p.m. - midnight period. This translates into a cross elasticity of demand of 0.31. Using econometric modelling results, the study further estimated that, under an optimistic view, there would be a 27 per cent stimulation of messages in the 11:00 p.m. - midnight period due to the lower rate that would now apply.

In a 1982 Bell study on Intra Off-Peak Discount Plans, the company examined the impact of changes to the start- and end-times of some discount periods (i.e. 5:00 p.m. instead of 6:00 p.m., 10:00 p.m. instead of 11:00 p.m. and 9:00 a.m. instead of 8:00 a.m.) on long-distance traffic within its territory. It reported as follows:

> Assumptions on the shift in demand were derived from a graphical analysis of the distribution of calls by five minute intervals. The graphical analysis indicated that there was increased calling at the beginning of the existing discount periods at 6PM and 11PM, and towards the end of the overnight discount period between 7AM and 8AM. This calling would probably shift into the more convenient shoulder period, if that were discounted.... For the shifting from higher- priced periods it was assumed that the extension of discount periods to 8AM - 9AM and 5PM - 6PM would not attract traffic from the remainder of the full-rate period, because of the inappropriateness of the time for most people (travelling to or from work). For the 10PM - 11PM period, however, it was assumed messages in the 10PM - 11PM would increase by 20% due to shift from the 6PM -10PM period.[3]

If Bell's assumption is correct with regard to the 20 per cent shifting of messages, this would imply a cross elasticity of demand of 0.4.

6.3.3 Local Measured Service versus Effective Use

Local measured service (LMS), as a form of usage-sensitive pricing, might be able to increase the effective use of the network by encouraging off-peak usage and directing traffic from peak to off-peak periods.

Based on a study by R.E. Park et al.,[4] this section describes the results of a measured-pricing experiment conducted by General Telephone and Electronics (GTE) in 1977. In that experiment, GTE implemented non-time-of-day non-optional measured service tariffs for residential individual lines in three cities in central Illinois. Multi-party customers were allowed to stay on a flat rate throughout the experiment. Based on usage data collected for the experiment, the study applied an econometric model to examine the effects of access and usage price changes on telephone use. The following price effects were found:

Estimated Price Effects

Resulting from a 1¢ Increase in	Per Cent Change due to Repression	
	Calls	Minutes
Per-Call Charge	-3.0	-3.4
Per-Minute Charge	-5.5	-10.9

Note: Repression is that part of the decrease in individual-line telephone use that is not offset by the increase in multi-party use.

The estimated price effects are not themselves elasticities. In the study, elasticity is given as the price effect multiplied by the corresponding price. The measured rates in the three cities included in the experiment were 2.5¢ per call plus 1¢ per minute of usage. The estimated price elasticity of repression is as follows:

Charge	Repression Elasticity	
	Calls	Minutes
Per-Call Charge	-0.075	-0.085
Per-Minute Charge	-0.055	-0.109

The study concluded that usage prices have a small but definite effect on local telephone use, with price elasticities ranging up to about 0.1 in absolute value.

Other research suggests that residential users are more responsive to usage charges than business users. For instance, a study by the New York Telephone Company[5] on the effects of measured rates on demand for usage found a price elasticity of -0.18 for the business market and -0.35 for the residential market. The subject of LMS is further discussed in Chapter 10. A survey of the literature concerning LMS, including analysis of its traffic impact, is contained in a recent paper prepared by staff at the Ontario Ministry of Transportation and Communications.[6]

6.4 Effective Utilization of Network Capabilities

An additional dimension to "effective use" involves the utilization of network switching and transmission capabilities to provide new services to the public and new revenues for the industry. Such utilization of network capabilities could capitalize on the physical presence of telephone equipment in most residential and business locations, existing capacity that often lies idle, the computer intelligence that either has been or could be built into the network, etc. To illustrate, use of the network in this way could involve, where markets exist, the provision of meter reading and alarm systems, the development of long-distance and local service features involving new and imaginative uses of network intelligence, or the development of new services based on the integrated movement and management of information. This aspect of effective use is included to emphasize the very considerable potential available to the telecommunications industry to enhance Canadian telecommunications and heighten the strategic importance of the industry to Canadians.

6.5 Conclusion

This chapter has reviewed data concerning the current traffic distribution of local and long-distance calling. Together with the findings of a number of studies as to the extent to which traffic will shift between time periods or could otherwise be affected by rate design, the data suggest that some increase in effective use of the network may be possible. The chapter has not, however, explored specific possibilities in this regard, nor has it attempted to quantify any savings that could be realized as a result. Effective use may also be fostered by utilization of network capabilities to provide new services to the public and new revenues for the industry.

CHAPTER 6

ENDNOTES

1. Bell Canada, "Report on Bell Canada Intra Off-Peak Discount Plans," Follow-up item to Telcom Decision CRTC 81-15, June 1982.

2. Lambert, Myron L., "The Failure of An Off-Peak Rate to Level Load in Interstate Telephone Service," Public Utilities Fortnightly, 2 February 1984.

3. Bell Canada, Note 1, supra: p.21.

4. Park, R.E., B.M. Wetzel and B.M. Mitchell, "Price Elasticities for Local Telephone Calls," Econometrica, November 1983.

5. New York Telephone Company, "Testimony and Exhibit of S.F. Cordo," Docket No. 27100, 17 November 1980. Cited in Telecommunications Demand: A Survey and Critique, by L.D. Taylor, 1980.

6. Ontario Ministry of Transportation and Communications, "Local Measured Service: Background and Issues," Communications Division, December 1985.

CHAPTER 6

APPENDICES

CHAPTER 6

APPENDIX A
CLASS 5 (LOCAL) SWITCHES

Summary of Typical Peak-Volume Local Traffic Patterns*

	FIRST PEAK			SECOND PEAK			THIRD PEAK		
	Urban[1]	Suburb.[2]	Rural[3]	Urban[4]	Suburb.[5]	Rural[6]	Urban[7]	Suburb.[8]	Rural[9]
Beginning Hour Period:	10 AM to noon	5 PM to 7:30 PM	7 PM to 11 PM	4 PM to 8 PM	5 PM to 9 PM	10 AM to 11 A.M	6 PM to 8 PM	7 PM	—

* Includes data for those companies, as indicated in the text, that provided information on a non-confidential basis.

The notes below indicate instances where company traffic patterns deviated from the norm shown in this table.

Notes:

1. SaskTel showed its first peak in the 12:00 - 1:00 p.m. period. Télébec showed its first peak in the 4:30 - 5:30 p.m. period.

2. Bell Canada showed its first peak in the 10:00 - 11:00 a.m. period.

3. Bell Canada showed its first peak in the 4:00 - 5:00 p.m. period.

4. Bell Canada showed its second peak in the 3:00 - 4:00 p.m. period. Télébec showed its second peak in the 11:30 a.m. - 12:30 p.m. period.

5. Bell Canada showed its second peak in the 4:00 - 5:00 p.m. period. MT&T showed its second peak in the 3:30 - 4:30 p.m. period.

6. MT&T showed its second peak in the 9:00 - 10:00 p.m. period. NBTel showed its second peak in the 1:00 - 2:00 p.m. period.

7. Manitoba Telephone Systems and Télébec showed their third peaks in the 2:00 - 4:00 p.m. period. SaskTel showed its third peak in the 12:00 1:00 p.m. period.

8. Bell Canada was the only telephone company showing a significant third peak for suburban areas.

9. Telephone companies did not show significant third peaks for rural areas.

CHAPTER 6

APPENDIX B
CLASS 4 (LONG-DISTANCE) SWITCHES

Summary of Typical Peak-Volume Long-Distance Traffic Patterns*

	FIRST PEAK			SECOND PEAK			THIRD PEAK		
	Urban[1,2]	Suburb.[3]	Rural[4]	Urban[5]	Suburb.	Rural[4]	Urban[6]	Suburb.	Rural[4]
Beginning Hour Period:	10 AM to noon	9 AM to 11 AM	—	9 AM to 11 AM	4 PM to 5 PM	—	1 PM to 4 PM	7 PM to 8 PM	—

* Includes data for those companies, as indicated in the text, that provided information on a non-confidential basis.

The notes below indicate instances where company traffic patterns deviated from the norm shown in this table.

Notes:

1. B.C. Tel showed its first peak in the 7:00 - 8:00 p.m. period. NorthwesTel showed its first peak in the 8:00 - 9:00 p.m. period.

2. Bell Canada was the only telephone company to provide information for urban, suburban and rural exchanges. AGT provided information for a suburban exchange.

3. AGT showed its first peak in the 9:00 - 10:00 a.m. period, while Bell Canada showed its first peak in the 10:00 - 11:00 a.m. period.

4. Bell Canada results show a fairly flat traffic pattern for rural exchanges.

5. Bell Canada, NBTel and NorthwesTel showed their second peak in the 2:00 - 4:00 p.m. period. Manitoba Telephone System showed its second peak in the 5:00 - 6:00 p.m. period.

6. Bell Canada and NBTel showed their third peaks in the 9:00 - 10:00 p.m. period. MT&T showed its third peak in the 3:00 - 4:00 p.m. period.

CHAPTER 7

Effects of Telecommunication Rates on Facilitating Cost-Effective Business Communications and Encouraging Technological and Service Innovation

CHAPTER 7

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7.1 Introduction

In order for non-telecommunication businesses to make cost-effective use of telecommunications, firms must make efficient use of these services as a part of their overall operations. This requires that the telephone companies provide an efficient mix of services, at efficient prices and using the most cost-effective technologies available. Distortions involving the pricing of telecommunication services send misleading signals to users and result in either the overuse or the underuse of services.

Prices affect cost-effective usage of telecommunication services directly through their impact on the decisions of business regarding the use of such services and related technology. At any set of prices, businesses will adapt their utilization of telecommunication services to take the best advantage of them. Thus, a key variable is the sensitivity of telecommunications demand to price -- that is, the elasticity of demand. The extent to which price distortions result in economic losses depends on the sensitivity of demand to changes in prices: when demand is sensitive to price changes, small distortions in prices may result in large fluctuations in demand; conversely, price changes affecting services for which demand is insensitive to price -- such as for local telephone service -- will have little impact on demand.

There is an additional, indirect, impact of telecommunication prices on business usage -- through their impact on the prices of all goods and services. Since telecommunications is part of the total cost of doing business, their costs flow through into the price of the goods and services that firms using them sell. Thus, high telecommunication costs will drive up the prices for goods and services, particularly where telecommunications represent a relatively large portion of overall production costs. Depending on the elasticity of demand for these products, there will be a larger or smaller impact on their demand.

Higher prices for telecommunications can also provide an incentive to invest in research and development in new technology and services. However, it is difficult either to prove or disprove that price alone has played a major role in determining the rate of technological progress in this area. It should be borne in mind that other characteristics of the marketplace affect the allocation of resources in ways that may accentuate or compensate for distortions in the pricing system.

Rate-base-rate-of-return regulation of telephone companies and depreciation rates prescribed as appropriate to monopoly provision of services have affected the introduction of new technology and new services as well as their pricing. During the 1980s, changes in regulatory policy respecting competition and price setting have altered both the incentives for carriers and the service offerings available.

Industry structure has had a further impact because major users may find it more economic to construct their own systems, in competition with the telephone companies. This gives them bargaining power to attempt to obtain rate structure concessions that would not be available to less influential groups.

The price of service is therefore properly seen as but one factor, albeit a major one, within the telecommunications policy and technological environment. To a large extent, price may be regarded as mediating or translating technological, policy, regulatory and industry structure into resource allocation. In the discussion that follows, the approach taken is to consider separately the cost-effective use of telephone company services by business, and the related topic of technological and service innovation in the industry.

7.2 Cost-Effective Business Communications

7.2.1 Major Characteristics of Business Uses of Telecommunication Services

Canadian businesses are large users of telecommunications. They account for approximately 50 per cent of total revenues earned by telecommunication companies. Canadian firms spend a large portion of their telecommunications-related expenditures on various kinds of long-distance services. In addition, for some businesses expenditures on local services are also significant. For example, banks, trust companies and other organizations with widespread branch networks depend heavily on local telephone service, and much of their telecommunication expenditures are in this area. Travel and real estate agencies similarly generate a high volume of local traffic. Firms involved in information-intensive activities -- such as telemarketers and market survey companies -- also generate high volumes of local and long-distance traffic per access line.

Overall, a relatively small number of users generate the majority of business use of telecommunication services. For instance, with respect to local

services, Bell Canada data supplied to the examination indicate that approximately 50 per cent of private branch exchange (PBX) traffic is generated by only 12 per cent of business subscribers with PBXs. Key and individual-line business service is somewhat less concentrated among heavy users, with 22 per cent of users of key systems generating 50 per cent of the total traffic of such users. Individual-line business usage is similarly distributed.

With respect to long-distance services, a small percentage of users generate the majority of business telecommunication revenues. A breakdown, derived from information provided during the course of the examination by two of the telephone companies, is provided below for some categories of long-distance traffic:[1]

> Québec-Tél -- 13.6 per cent of all business customers account for 45.88 per cent of total message toll service (MTS) revenues (1985) and 57.73 per cent of total interexchange revenues (1984).
>
> NorthwestTel -- 5 per cent of business network access lines generate 44.8 per cent of business MTS revenues.

The following information regarding the concentration of business use of MTS and WATS services is available from the CRTC Interexchange Competition proceeding:

> Bell Canada[2] -- 5 per cent of customer accounts generate 58 per cent of business MTS revenues, and 5 per cent of customer accounts generate 41 per cent of total wide area telephone service (WATS) revenues.
>
> B.C. Tel[3] -- 5 per cent of customers generate 72 per cent of business MTS revenues, and 1 per cent of customers generate 100 per cent of WATS revenues.

It should be noted that there is considerable variation among the telephone companies in the degree of concentration of traffic.

Canadian businesses have reached a high level of dependence on telecommunication services for the efficient conduct of their activities. On a local basis, some businesses are highly dependent on customers calling them for

services, products and information. Firms operating regionally, nationally or internationally also depend heavily on the ready availability of high quality, reasonably priced telecommunication services to ensure efficient operation and marketplace competitiveness. For many firms generating the majority of usage (as indicated above), telecommunications are critical to their success.

The following comment in Business Week underscores the importance of telecommunications for business: "Information is becoming a strategic resource for multinational companies, and moving it around is a part of the equation."[4] This quotation points to information as the underlying commodity of business success. Efficient telecommunications enhance the value of this vital resource.

7.2.2 The Importance of Telecommunication Costs for Business

a) Telecommunications as a business cost

Available evidence indicates that telecommunication costs for Canadian firms constitute, on average, a relatively small portion of the total cost of doing business. There are, however, wide variations across industries and among individual firms in the proportion of total costs attributable to telecommunications. This conclusion is derived from the following sources:

1. Statistics Canada Input-Output Tables dealing with "Expenditures by Canadian Industries on Telephone & Telegraph Services."

2. Responses by telephone companies to information requests made as part of this examination.

3. A 1986 study by D.A. Ford and Associates entitled, "The Impact of International Competition on the Canadian Telecommunications Industry and Its Users."[5]

4. A survey of Canadian business users commissioned as a part of the examination.

The information available from these Canadian sources and from the United States is discussed below.

Input-Output Tables compiled by Statistics Canada for 1981 show the expenditures of Canadian industries on telephone and telegraph services,* ranked by absolute amount and by percentage of total business expenditures (see the Appendix to this chapter). These tables indicate that, on average, Canadian firms' expenditures on telephone and telegraph services were 0.7 per cent of their total expenditures in 1981.

Furthermore, the percentage of their total expenditures devoted to telecommunications has been rising -- from 0.54 per cent in 1961, to 0.6 per cent in 1971, to the 1981 level. This appears to result from an increase in usage by all businesses of telecommunication services related to the decline in their relative price and to the faster growth of those industries that make greater use of telecommunications. Table 7.1 extracts from these tables the ten industry sectors with the highest absolute telecommunication expenditures and those with the highest percentages of telecommunication expenditures relative to their total business expenditures.

TABLE 7.1
Telephone and Telegraph Expenditures for Top Ten Industry Sectors, 1981

Industries Ranked by Expenditures Devoted to Telecommunications	Expenditures ($ millions)	Industries Ranked by Percentage of Expenditures devoted to Telecommunications	% Total Expenditures devoted to Telecommunications
Other Fin. Ins. & Real Es.	555	Radio & TV Broadcasting	5.2
Wholesale Trade	461	Health Services	3.0
Retail Trade	335	Banks & Credit Unions	2.8
Health Services	209	Rwy. Transport	2.7
Banks & Credit Unions	201	Misc. Services to Business	2.4
Misc. Services to Business	191	Advertising Services	2.3
Rwy Tranport	148	Wholesale Trade	2.1
Truck Transport	132	Other Fin. Ins. & Real Est.	2.0
Accommodation & Food Services	123	Construction - Other	2.0
Communications Industries	106	Insurance	1.7
TOTAL	**2 461**		

* Statistics Canada Input-Output Tables refer to "telephone and telegraph" rather than telecommunications expenditures.

In the first category, the top ten industries spent $2.46 billion on telephone and telegraph services in 1981. This represents about 62 per cent of the approximately $4 billion spent by the 189 industry sectors included in the Statistics Canada Input-Output Tables. With respect to the second category, the percentage of expenditures devoted to telecommunications ranged from 1.7 to 5.2 per cent for the ten industry sectors with the largest percentage of expenditures on telecommunications. The percentage expenditures for some subsectors of these industries were higher than those identified for the industries as a whole.

Some of the industries that rank high in total telecommunication expenditures but not on MTS expenditures spend heavily on local telephone services. Banks, for instance, have extensive local branch systems and, as a consequence, have significant expenditures for local services. While lower long-distance rates would benefit banks and related types of business, substantial increases in local rates, if implemented as part of rate restructuring, could wipe out such gains for some businesses.

Additional information on the importance of telecommunication expenditures to business is provided in the D.A. Ford study (1986). This information was based on a survey of approximately 40 large businesses across Canada whose total annual telecommunication expenditures amounts to $400 million. Information on the telecommunication costs of small and medium-size businesses was obtained from a survey of another 40 or so companies located in the Ottawa area and representing a broad cross-section of types of business. The mix of telecommunication services used by these firms is shown in Table 7.2. This table indicates that public and private long-distance voice services account for 33 per cent of total telecommunication expenditures for large businesses, while local voice services account for about 29 per cent of their expenditures. Together, data, satellite and special-assembly or non-tariffed services account for just over 38 per cent of their telecommunication expenditures.

In addition to providing an indication of the overall importance of the various major categories of business expenditures, the table allows assessment of some of the specific subcategories of service. For example, 1.4 per cent and 0.6 per cent of expenditures for MTS are Canada-US and Canada-overseas, respectively. In addition, 4.7 per cent and 14.5 per cent of the telecommunication expenditures of the firms surveyed are on Canada-Canada private-line voice and data services, respectively.

TABLE 7.2
Mix of Services for Companies Surveyed in D.A. Ford Study, 1986

Service		Annual Expenditures ($ thousands) Small Business	Total Sample	Sample Per Cent
MTS	Canada-Canada	7.4	44 510.5	11.2
	Canada-US	0.9	5 512.6	1.4
	Canada-Overseas	0.4	2 550.3	0.6
WATS	Intra-provincial	2.2	12 962.2	3.3
	Inter-provincial		9 576.0	2.4
'800'	Canada-Canada		16 888.1	4.2
service	Canada-US		302.7	0.1
Total Long-Distance		**10.9**	**92 302.3**	**23.2**
Private Lines - Voice				
	Canada-Canada	2.0	18 701.2	4.7
	Canada-US		2 999.5	0.8
	Canada-Overseas		15.6	.0
Telpak				
	Canada-Canada		11 263.1	2.8
	Canada-US		6 007.1	1.5
	Canada-Overseas		0.0	0.0
Total Private Line Voice		**2.0**	**38 986.6**	**9.8**
Private Lines - Data				
	Canada-Canada		57 816.2	14.5
	Canada-US		3 109.0	0.8
	Canada-Overseas		3 309.0	0.8
Total Private Line Data		**0.0**	**64 234.2**	**16.1**
Local Service Costs - Voice				
	Terminal Equipment			
	- Telephone Co. Lease	2.6	76 479.9	19.2
	- Third Party Lease		3 965.0	1.0
	- Cust. Owned and Maintained		5 888.0	1.5
	Central Office Access Lines	3.8	28 398.0	7.1
Local Service Costs - Data				
	Terminal Equipment			
	- Telephone Co. Lease		10 550.6	2.7
	- Third Party Lease		3 011.2	0.8
	- Cust. Owned and Maintained		4 004.0	1.0
	Central Office Access Lines		165.2	.0
	Intraexchange H/S Data Lines		429.9	0.1
Total Local Service Costs		**6.4**	**321891.8**	**33.4**
Switched Data				
	Telex or TWX			
	Canada-Canada		3 345.5	0.8
	Canada-US		494.1	0.1
	Canada-Overseas		1 113.2	0.3
	Packet Switched			
	Canada-Canada		3 651.0	0.9
	Canada-US		0.0	0.0
	Canada-Overseas		171.0	0.0
Total Switched Data		**0.0**	**8 774.9**	**2.2**
Satellite Services			12 000.0	3.0
Special Assemblies & Non-Tariffed Services			48 757.0	12.3
Total Telecom Costs		**19.3**	**397 946.8**	**100.0**

Source: D.A. Ford (1986), Exhibit 13: Mix of Services for Companies Surveyed.

The small business sample of the D.A. Ford study yields a useful comparison with the larger firms that dominate the sample. Table 7.3 shows that in the small firm sample, Canada-Canada MTS accounted for 38.3 per cent of their telecommunication costs, compared with the 11.2 per cent within the overall sample. Local service costs, on the other hand, accounted for 33.2 per cent of small business telecommunication costs -- almost the same as for the total sample (33.4 per cent). The small businesses in the sample used no data, satellite, special-assembly or non-tariff services, while these services accounted for 38.2 per cent of the total sample expenditures on telecommunications.

TABLE 7.3
Mix of Telecommunication Services for Small Business Sample

Service		Small Business ($ thousands)	% of Total Telecommunication Costs
MTS	Canada-Canada	7.4	38.3
	Canada-US	0.9	4.7
	Canada-Overseas	0.4	2.1
WATS	Intra-provincial	2.2	11.4
	Inter-provincial		
'800'	Canada-Canada		
	Canada-US		
Total Long-Distance		**10.9**	**56.5**
Private Line - Voice			
	Canada-Canada	2.0	10.4
Total Private Line Voice		**2.0**	**10.4**
Total Private Line Data		**0.0**	**0.0**
Local Service Voice			
	Telephone Company Lease	2.6	13.5
	Co. Access Lines	3.8	19.7
Local Service Data		0.0	0.0
Total Local Service		**6.4**	**33.2**
Total Telecommunication Costs		**19.3**	**100.0**

Source: Table 7.2.

A further line of inquiry in the D.A. Ford survey was the magnitude of telecommunication expenditures in respect of total business costs. The report states: "For the companies interviewed, total telecommunications costs represented a relatively small share of total purchased inputs, ranging from a low of 0.7 per cent to a high of 11.9 per cent."[6]

Market data from a survey of Canadian businesses commissioned by the examination indicate some of the characteristics of small business use of telecommunications. These data indicate that for firms with under 50 employees, MTS accounted for 40 to 46 per cent of their total telecommunication expenditures. WATS accounted for 3 to 11.6 per cent of expenditures, and private-line service for 0 to 2.2 per cent. Individual business lines accounted for 24 to 30 per cent of telecommunication expenditures, PBX trunks for 1.0 to 6.2 per cent, and Centrex for 0.3 to 1.9 per cent.

These results compare fairly closely with the D.A. Ford study findings. The survey also found that long-distance expenses accounted for approximately 50 per cent of telecommunication expenditures, with smaller firms spending proportionately more on MTS and larger firms spending more on WATS and private lines. Local service expenses accounted for 29 to 36 per cent of total telecommunication expenses.

In the survey, telecommunication expenditures as a proportion of total expenditures for small firms appear to be close to the industry-average information available from the Statistics Canada Input-Output Tables. Approximately 68 per cent of firms reported that telecommunications account for 1 per cent or less of total expenditures. Twenty per cent of the firms reported telecommunication expenditures amounting to between 2 and 5 per cent of total expenditures, while 12 per cent reported that they exceeded 6 per cent of total expenditures.

It is also possible, due to the breakdowns within the examination survey sample, to identify differences among provinces, firms of different sizes and across industries. (This is not possible using the input-output data from Statistics Canada.) The differences among provinces in the percentage share of business expenditures devoted to telecommunications are fairly large at the extremes. The proportion of firms in the Atlantic provinces with 2 per cent or more of total expenditures going to telecommunication services is substantially less than average at 24.4 per cent, while it is quite high in Quebec at 38.5 per cent.

There also appears to be a tendency for smaller firms to spend proportionately more on telecommunications than the larger firms in the sample. Approximately 24 per cent of the firms with 50 to 99 employees devoted more than 2 per cent of their total expenditures to telecommunications. On the other hand, the smallest firms -- with 1 to 4 employees -- had the largest proportion devoting 2 per cent or more of expenditures to telecommunications (32 per cent).

The percentage of firms in the survey reporting that spending on telecommunication services accounted for 2 per cent or more of total expenditures also varied considerably from industry to industry. The industries included in the examination sample showed that the highest percentage of firms devoting more than 2 per cent of their expenditures to telecommunication services were in wholesale businesses (44 per cent) and manufacturing (34.8 per cent). Agriculture and food industries was the lowest industry sector (14 per cent), while mining was also relatively low at 20 per cent. Construction, transportation, communications and public utilities, retail, finance, and service sectors were close to the sample average.

Additional comparisons between spending on telecommunications by Canadian versus US businesses are possible using 1984 survey data developed by the International Communications Association (ICA).[7] It is necessary to be cautious in interpreting these data, however, because the definition of industries may differ from those used by other sources.

The ICA data suggest that for some industries, telecommunications spending by Canadian businesses constitute a higher proportion of total expenditures than for US firms. For example, the 100 largest US banks report devoting 0.68 per cent of their total expenditures to telecommunications, while Canadian banks and credit unions, according to Statistics Canada, allocate as much as 2.8 per cent of their total expenditures to telecommunications. US insurance companies, retail trade, aircraft and parts manufacturers, and printing and publishing also report telecommunication expenditures that are substantially lower as a proportion of total expenditures than the same Canadian industries.

However, Canadian air carriers reported devoting 1.2 per cent of their total expenditures to telecommunications, while major US air carriers have reported that telecommunications accounted for 2.0 per cent of total spending. Similarly, Canadian motor vehicle manufacturers report telecommunications spending at 0.2 per cent of total spending, while the percentage for US motor vehicle manufacturers was reported at 0.3 per cent.

It is unlikely, in view of the size of the differences between the Canadian and US industries indicated, that they are determined solely as a result of differences in the price of telecommunication services in the two countries. Rather, it is probable that they reflect differences in industry structure as well as in industry definitions.

b) Impact of telecommunication costs on international competitiveness

Concerns have been expressed by Canadian business representatives that high Canadian long-distance telephone rates, in comparison to those in the United States, have had a negative impact on the international competitiveness of Canadian firms. These concerns have been expressed on a number of occasions, among them in a recent submission by the business group, Canadians for Competitive Telecommunications.[8] In that paper, comparisons between Canadian and US telecommunication rates were made which suggest that Canadian rates are significantly higher.

Although international competitiveness involves a variety of factors -- from market openness to product quality -- prices and costs also play an important role. Several studies have analysed different aspects of the anticipated influence of telecommunication prices on international competitiveness. For example, estimates of the impact of telecommunication costs on the competitiveness of Canadian businesses and Canada as a place to do business are contained in the D.A. Ford study. Among other things, that study examines the likely effects on Canadian business of adopting US telecommunication rates. An observation which can be made from data presented in the Ford study is that such adoption of US rates in Canada would result in telecommunications price reductions averaging approximately 13 per cent for most industries. Most sectors, they conclude, would benefit. However, because of differences in levels of usage of telecommunications, small firms would benefit somewhat less than large ones. Nevertheless, US rates would result in a savings to small firms of approximately 9 per cent.

One part of the D.A. Ford study is a macroeconomic analysis of the impact on the economy as a whole of adopting US telecommunication rates for business. The conclusions of this analysis must be regarded with caution, however, since offsetting measures to compensate telephone companies for the loss of revenues due to reduced rates were not considered. Still, the analysis does forecast that the impact of lower long-distance rates would not be large in proportion to the size of the economy -- there would be a small positive effect on exports, while imports would be affected little. The sectors that would benefit most would be manufacturing, followed by transportation and storage, communication, and primary construction.

An indication of the telecommunications expenditure impact for 24 Canadian industries is provided in Table 7.4. This table combines information from the Ford study and Statistics Canada. It shows that wholesale trade, financial industries and miscellaneous services to business would receive the largest telecommunications price savings if US rates were implemented.

TABLE 7.4
Impact of US Telecommunication Prices by Industry on 1981 Telecommunication Expenditures

	Weighted Averagef Ratio of US/Can Ratio	Telecom Expenditure Savings ($ millions)
Wholesale Trade	0.746	117.094
Other Fin. Ins. & Real Estate	0.91	49.95
Banks & Credit Unions	0.792	41.808
Misc. Services to Business	0.881	22.729
Truck Transport	0.87	17.16
Air Transport	0.816	10.304
Retail Trade	0.972	9.38
Radio & TV Broadcasting	0.928	6.264
Gas Distribution	0.716	3.976
Iron & Steel Industry	0.804	3.136
Motor Vehicle Mfrs.	0.886	2.964
Agricultural Implement	0.689	2.177
Petroleum & Gas Wells	0.921	1.738
Forestry	0.773	1.589
Fish Products Industries	0.805	1.17
Iron Mines	0.712	1.152
Misc. Mfg. Industries	0.77	1.15
Major Appliances Elect. &	0.85	1.05
Flour & Breakfast Cereal	0.752	0.744
Cement Mfrs	0.914	0.258
Aircraft & Parts Mfrs	1.016	-0.416
Electric Power	1.124	-0.992
Insurance	1.077	-6.237
Accommodation & Food Serv.	1.094	-11.562
TOTAL		276.586

Sources: Statistics Canada Input-Output Tables, 1981; and D.A. Ford & Associates, 1986.

The findings of the Ford study are generally consistent with the effects of lower long-distance rates predicted by two other recent studies -- one Canadian, by Informetrica Limited,[9] and the other conducted in the United States by Wharton Econometric Forecasting Associates.[10] The Informetrica study was done at the request of Bell Canada, using the company's proposal for rate rebalancing. According to this study, the rebalancing of telephone rates would result in a 10 per cent increase in the cost of telephone service to consumers generally, while the cost to business would fall by approximately 22 per cent. The effect on the output of the economy as a whole is projected as a $2 billion annual increase in Gross National Product after five years. Exports would rise by $83 million over the same period while imports would rise by $296 million, resulting in a slight fall in net exports.

The Informetrica study is of limited use, however, in providing a good indication of the impact of changed rates on international competitiveness because the exchange rate was constrained in the analysis. Thus, the decline in net exports suggested by the study indicates the stimulation effect of rate changes, not a deterioration in competitiveness.

The Wharton study concluded as follows:

> The decline in the prices of U.S.-produced goods and services (resulting from lower long distance rates) generates an increase in net real exports of goods and services by making U.S. exports cheaper relative to those produced by international competitors, and by making goods and services relatively more expensive than comparable domestically produced items.[11]

The predicted effects on international competitiveness are relatively small in terms of the size of the US economy. A 10 per cent reduction in long-distance rates, without any offsetting increase to local rates, would result in a 1 per cent increase in real US exports and a 0.3 per cent reduction in real US imports over several years. Furthermore, like the D.A. Ford study, the Wharton study did not take into account any rate increases necessary to compensate for long-distance rate reductions.

In a study done for the Economic Council of Canada, Postner and Wesa[12] analysed Canadian productivity performance using input-output tables to show the linkages between the productivity of individual industries and overall performance. Their study emphasized that much productivity improvement in the economy occurs as a result of the flow of productivity gains from one industry to another. The benefits from lower prices and higher productivity in

telecommunications therefore spreads to all industries. Postner and Wesa concluded that because telecommunications has had a very good productivity performance, and because it is a significant input into the costs of other industries, it has a key role to play in stimulating Canada's productivity growth and, by implication, its international competitiveness:

> There are three Canadian industries that have a potential in the future for playing a role in raising productivity.... One of these industries -- namely, Communications -- is already stimulating balanced productivity growth. All indications are that Communications is a rapidly growing intermediate service industry, having significant technological advances and contributing corresponding productivity growth to all important components of final consumption.[13]

Regarding the decision as where to locate the firm, only a minority of the firms in the survey commissioned by the examination felt that telecommunication costs were either somewhat or very important to location within Canada (18.4 per cent), or in a particular province (24.4 per cent). Larger firms generally attached more importance than small firms to telecommunication costs as a factor relating to the decision to locate in Canada. Of firms with 50 to 99 employees, 31 per cent considered it important.

There were also considerable differences among the provinces in the importance given to telecommunication costs as a factor influencing location in Canada. Quebec firms were considerably above the sample average with 30.4 per cent of firms in that province considering it important. British Columbia was considerably below the average at 7.8 per cent. As a group, the three Prairie provinces (Alberta, Saskatchewan and Manitoba) were also somewhat below the average at 12.9 per cent. Other provinces did not appear to deviate significantly from the sample mean.

The three industries that gave the most importance to telecommunication costs as a factor influencing location in Canada were manufacturing (29 per cent considered it important), agriculture (28 per cent) and wholesale (24 per cent). Retail firms (13.7 per cent) and service firms (16.8 per cent) gave the least importance to telecommunications as a factor influencing location in Canada. Mining, construction, finance, transportation, communication and public utilities were close to the average in the importance attached to telecommunications as a location factor.

The Ford study also addressed this question to its sample, one composed mainly of large firms. That study found that telecommunication costs are rarely a primary consideration affecting location, even for company facilities within Canada.

An additional aspect relating to the significance of telecommunications for international competitiveness is the perception by business of its importance in relation to competitiveness. Telecommunication costs were considered to be important to international competitiveness by only a small minority of the sample of firms surveyed for the examination (8.3 per cent). As with telecommunication costs as a location factor, there were considerable differences among the provinces. The percentages ranged from a low of 4.3 per cent for British Columbia and 6.2 per cent for the Prairie provinces to as high as 13.3 per cent for the Atlantic provinces. Again, the larger firms within the sample attached more importance to telecommunication costs as a factor influencing international competitiveness. In the smallest firms (1 to 4 employees), 7 per cent considered telecommunication costs important, while 23 per cent of those firms with 50 to 99 employees did.

The industries that gave the most importance to telecommunications as a factor influencing international competitiveness were: wholesale businesses (16.8 per cent), mining (16.5 per cent), manufacturing (15.2 per cent) and finance (14.9 per cent). Those for which the percentages identifying telecommunication rates as important were low included construction (1.6 per cent) and transportation, communication and public utlilities (5.2 per cent).

c) Sensitivity of business to telecommunications price changes

Available evidence suggests that business demand for local services is quite insensitive to price, although not totally so. Lester Taylor, who has testified on a number of occasions before regulatory commissions as an expert witness regarding telecommunications demand, has reviewed several studies on this subject.[14] These studies present evidence respecting the demand for basic telephone services, business main stations and terminal equipment, and for additional message units (where business service is provided in measured units). Two of these are based on Canadian data -- those of Dobell et al.[15] and Waverman.[16] The price elasticities of demand in Taylor's sample range from

-0.03 to -0.18, including both short-run and long-run elasticities, which are normally larger in absolute terms.

However, there are a number of relationships which it would be important to establish before any definitive conclusions could be drawn. There are, for instance, no examples in the studies reviewed by Taylor of the demand for PBX trunks, Centrex or key systems. It is more than likely that there would be strong cross elasticities between competing services -- such as between PBX trunks and Centrex services. Furthermore, of the studies considered by Taylor, only one examines the elasticity of demand for message units of local service. That study, by New York Telephone,[17] produced an estimated short-run price elasticity of -0.18 for business demand for "additional message units."

Beauvais[18] and Cohen[19] found estimates of the price elasticity of demand for usage by residence customers during the daily peak period to lie around -0.11, increasing to approximately -0.18 during the shoulder period. It seems reasonable that residence customers should be more sensitive to price than businesses, making it likely that the business elasticity estimates would be somewhat lower in absolute value.

Conflicting evidence exists regarding the response of business to price changes in long-distance services. Again, Taylor has reviewed a number of studies, some of which use Canadian data. Waverman,[20] for example, estimated an elasticity of demand for business MTS of -1.2 in 1974. Feldman[21] estimated price elasticities of demand for WATS ranging from -1.15 to -2.34, and cross price elasticities with regular MTS. The current view of most telephone companies in Canada is that MTS demand is inelastic with respect to price. That is, as the long-distance price is reduced, the offsetting increase in demand does not generate sufficient revenue to compensate for the reduced price. Still, there is disagreement among telecommunication companies as to the extent of elasticity of demand for long-distance services. During the CRTC Interexchange Competition proceeding, estimates of the price elasticity of demand for long-distance service (considering business and residence together) ranged from -0.4 (Bell) to -1.3 (CNCP). In this regard, however, telephone company estimates of elasticity appear to have been reduced substantially over the past decade.

Finally, Bell has provided evidence that price elasticity is higher in the discount rate market than in the full rate market, and is higher for long-haul calls than for short-haul calls.[22]

7.3 Technological and Service Innovation

7.3.1 Impact of Existing Rate Structures

Under existing rate structures, the telephone companies have been highly innovative in introducing services and facilities that embody new technologies. However, as noted earlier, economic distortions in pricing can be expected to cause corresponding distortions in service provision. According to this view, underpricing services causes, on one hand, demands for overprovisioning and, on the other, economic disincentives to invest in new facilities. In a contrasting manner, overpricing services reduces demand but provides economic incentives for the telephone companies to introduce new technologies and services.

The situation respecting incentives for investment in various aspects of the network is more complex than has been implied above. The telephone companies indicate that rates are not always a major factor in the deployment of new technologies. Decisions on technological and service innovations have often been driven by other factors, such as telecommunication policies, customer demands and competitive pressures.

To the extent that demand may be reduced by higher prices, some new facilities and services may not be economically feasible. However, the extent to which this has occurred is not known. In addition, there must be some consideration of the effect on the incentive for telephone companies to invest in new technology or take the risks of offering new services. If telephone companies have the expectation that higher profits for some services will be used merely to reduce prices for other services, the incentive to invest in the former services will be correspondingly reduced.

7.3.2 Impact of Rates on Services and Products

a) Changing technological environment

Manley Irwin, the author of numerous books and articles on developments in telecommunications technology, has argued that technological innovation in business communications is no longer under the control and direction of the telephone companies.[23] He takes the view that as a result of significant technological change, the telecommunications industry is now only one participant among many in a research and development arena that includes computer equipment manufacturers, computer service providers and major users.

The number of suppliers of telecommunication services and products has expanded dramatically in recent years. Similarly, those involved in manufacturing are no longer restricted to a few corporations. Furthermore, the demand for telecommunications is no longer either homogeneous or unified; rather, it is diversified, heterogeneous and segmented (e.g. data, voice, graphics, facsimile, teleconferencing and electronic mail). Finally, the boundaries between software and hardware have eroded.

The other side of this picture is that the telecommunication carriers continue to be a major presence in the marketplace. Their resources and stability, as well as the recognition that they have with business users, give them the possibility of influencing the introduction and determining the success of new innovations in technology. Non-telecommunication firms that have tried to compete with the major carriers have found that they must significantly underprice them. As a result, regulators in both the United States and Canada have been pressured to impose, or retain, structural separation and other constraints in competitive markets. The implication of this is that the level of long-distance rates is now only one of several factors influencing the diffusion of new technologies and services in the telecommunications marketplace, and to an increasing degree it is necessary to examine technological developments in the non-telecommunications business environment in order to understand better their impact on the telecommunications market.

b) Impact on products and services outside the exclusive control of the telephone companies

As already indicated, there is an increasing variety of telecomunication products, services and technologies that involve technologies outside the exclusive control of the industry. It is useful to consider specifically a number of these, as well as the impact of existing rate structures on them. They include:

- Electronic mail
- Videoconferencing
- Voice mail
- Automatic teller machine networks
- Point-of-sale terminal networks

- Telemarketing/Teleordering
- Financial services and
- Office automation.

These products, services and technologies all involve increasing the use of the telecommunications network. All of them are in the early stages of growth -- which implies that their eventual impact is still uncertain, that market penetration rates are considerably less than potential, and that annual growth rates may often be very high.

The technologies involved in these products and services, however, are likely to become the core technologies around which future business usage of telecommunication services will evolve. Consequently, their diffusion can potentially play a critical role in the growth of productivity of Canadian businesses generally. It is therefore important that there be an increased awareness of the effects that telecommunication rates may have on either promoting or retarding the diffusion of information technologies.

Electronic mail

At present, most electronic mail is internal -- intra-office and intra-company. Public systems have been slow to take off. However, electronic mail can do many things. For example, in the United States realtors use portable terminals to access computerized mortgage companies in order to arrange mortgages as part of a sale. In Canada, a stationery organization also uses electronic mail to link it with office-supply retail outlets to help cut costs, streamline operations and assist member companies in improving customer service.

The two major electronic mail services in Canada -- Telecom Canada's Envoy 100 and CNCP's EOS -- had between them approximately 90 000 subscribers as of March 1986. Envoy 100 has reported a growth of between 5 and 6 per cent per month and has plans to link up with US electronic mail services. Overall growth in electronic mail revenues has been running at approximately 20 per cent annually.

There are, however, a number of constraints on the growth of electronic mail. Among them, there is the cost of terminals, the cost of usage and the lack of interconnection among numerous incompatible systems. At this stage, the price of long-distance services appears to be only a minor factor, as businesses sort

out their preferences from among competing alternatives in the workplace, such as voice mail and facsimile.

Videoconferencing

Videoconferencing is a service of the future with a past full of disappointments. AT&T has quietly closed videoconferencing facilities in six of eleven cities in the United States. The lack of success in that country has been related to lack of cost effectiveness and the failure to reduce corporate travel.

Teleglobe Canada provides a facility for videoconferencing in Toronto which costs $1 200 per hour for a Toronto to London, England hookup, all inclusive. Telecom Canada also provides videoconferencing facilities: Two-way full motion videoconferencing between Toronto and Vancouver costs $1 500 per hour. The cost for a Toronto to London, Ontario hookup runs at $111 per hour for studio time and $76 per hour for the telecommunications link. Freeze-frame video is cheaper -- at $45 per hour for a Toronto to Montreal connection.

There are examples of major corporate commitments in the area of videoconferencing. The Royal Bank, for one, has made a major commitment, installing facilities at both Toronto and Montreal. Bell Canada and Texas Instruments have both used videoconferencing to launch high profile, large scale meetings in many locations. It would be fair to say that one of the greatest single impediments to the growth of videoconferencing in this country probably is the cost of long-distance telecommunications.

Voice Mail

While data transmission is becoming more important, 80 to 90 per cent of office communications are still by voice. Accordingly, it can be argued that the key to enhanced office productivity lies in value-added features that support voice communications, such as voice mail, voice annotation, text-to-voice and voice-to-text systems.

The potential for voice mail or voice messaging is created in part by the desire to avoid telephone tag. The average manager or professional generates approximately fifteen telephone calls per day. About 75 per cent of these are not completed on the first try, while only about 50 per cent actually require interaction. The value of voice mail, then, is in improving productivity by

reducing the number of telephone calls and making communication more efficient. Since the benefits of voice mail are based on efficient use of telephone time, it is unlikely that the demand for this feature would be increased by lower long-distance rates -- quite the opposite. Voice mail might actually be seen as a way to economize overall on telephone charges, although this would be a minor goal.

Automatic teller machine networks

Automatic teller machines (ATMs) in just a few years have made a dramatic impact on the banking business. In Canada, the concentrated structure of the banking industry has resulted in the development of proprietary networks. In the United States, where the banking industry is fragmented and regionalized, providing adequate service has required the development of national networks composed of many banks. Currently in the US, of a total 60 000 ATMs, 36 000 are in regional shared networks, with another 12 000 committed to join.

One such network is the New York City Cash Exchange (NYCE). Its network is run by a computer outside Milwaukee that runs ten such systems. The NYCE pays 10¢ per transaction to the computer controller of the network, A.O. Smith. To the extent that the cost of telecommunication services is a significant proportion of the 10¢ transaction charge, the cost of telecommunication links would be a major factor affecting the growth and cost-effectiveness of ATM networks.

Point-of-sale terminal networks

More and more retail operations are implementing point-of-sale (POS) systems in order to achieve more effective management of their businesses, to transmit critical operating data to head office computers and to improve cash management. A study by DMR and Associates[24] has predicted that POS networks will grow very rapidly in the next ten years. They will be especially important to department stores, chain stores, specialty shops, supermarkets and convenience stores. Retailers are finding that the data from POS terminals quickly becomes central to the effective management of their entire operation.

Telecommunications is a major cost component and thus a major part of the decision as to how to configure a POS network. The three main options are:

direct distance dialing, leased lines and a packet-switched network. The major factors determining which to choose include cost and performance requirements. For a typical configuration that would cost $100 000 per month with leased lines, packet switching would cost about 50 per cent less. Increasingly, because of its lower cost, packet switching is the preferred alternative. It is estimated that there are presently more than 20 000 POS devices using Telecom Canada's Datapac 3201 packet-switching service.

Telemarketing/Teleordering

There is evidence that telemarketing (marketing through use of the telephone) is growing rapidly, especially in the United States. Telephone companies also market telemarketing aggressively in Canada. Expenditures on telemarketing calls and equipment totalled $13.6 billion in 1983, with resulting sales of $75 billion. The fastest growing segment of the business is business-to-business telemarketing, which is increasing at a rate of 20 per cent annually.

The reason for the rapid growth of telemarketing is related to the costs per sale. Bell of Pennsylvania estimates that its cost for marketing telephone equipment is $240 per premises call, against $16 per telephone call.[25] The cost in premises calls per sale was estimated at $1 088, as against $160 for telemarketing calls per sale. Obviously, telemarketing is cost effective for high priced items. The cost of telemarketing, however, may be too high for low priced items.

A related aspect of telemarketing is teleordering. For instance, it has been asserted by the Canadians for Competitive Telecommunications group that low US long-distance rates make it economic to accept telephone orders for US publishers.[26] Canadian publishers, the group claims, cannot match these services and, as a result, they are at a significant competitive disadvantage.

Financial services

In a world where American Express can authorize expenditures through a global computer system in less than ten seconds, the role of telecommunications in providing financial services has come of age. The wiring of Wall Street has altered the stock market forever.[27] New technology has accelerated the pace

of trading in stocks, facilitated decentralization of trading and increased stock price volatility. A firm no longer need be located on Wall Street to make a market in stocks, if it has access to telecommunication links. An individual with a personal computer can also give direct buy or sell orders to his or her broker. Key technologies allow one-button access to multiple potential traders, and a nation-wide computer network links 500 US brokerages, pension funds and banks. A computer system has enabled the over-the-counter market to grow from 2.2 billion shares traded in 1971 to 16 billion traded in 1983. This system also makes it possible to rapidly tabulate and list transactions for the 570 most active stocks. As a result, the efficiency and speed with which dealers and brokers perform their functions has been greatly enhanced.

Office automation

Office automation and related information handling technologies constitute a technological driving force that is changing the role of telecommunications in business. The main direction of this force is towards increased utilization of telecommunications to make business perform in ways that are more efficient and productive.

Office automation has generated diverse reactions -- ranging from initial enthusiasm to confusion, disappointment and scepticism. Overall, the impact on office productivity so far has been mixed. Nevertheless, some major corporations, including IBM and Bell Canada, claim success and positive benefits from office automation. The applications generating the most benefits are in networked systems that facilitate inter- and intra-office communication -- including electronic mail, voice mail and the uploading and downloading of data. However, because so many of the products associated with office automation have relatively short product lives, and because office automation has not coalesced around a single set of standard operations and products, it is difficult to forecast the path it will take.

The main requirement for office automation to make a positive contribution to productivity is for compatibility among systems, equipment and software so that "islands of automation" can become part of larger networks. An open systems environment in which computers, word processors and terminals can interconnect and interwork everywhere, is still a considerable way off. Nevertheless, there does appear to be an important opportunity to increase

productivity in the office. One reason is that major users, such as General Motors and Boeing as well as major equipment vendors, such as IBM and Northern Telecom, have recognized the strategic importance of promoting open networking and they have made major commitments to it.

Telecommunication prices are not currently a major factor affecting either the adoption of office automation or its success. User acceptance, the resolution of equipment incompatibilities and effective programs to manage office automation are hurdles that stand in the way of major productivity benefits from office automation.

7.4 Conclusions

The main conclusion to be drawn from the preceding analysis is that for the majority of Canadian businesses, telecommunications represent a relatively small portion of the total costs of doing business. It may be surmised from this that telecommunications rate changes would have only a small impact on the general cost structure and performance of Canadian business both in domestic and international terms, even for large price changes. There is, of course, wide variation among firms in the perceived importance of telecommunication costs, and for some industry sectors and subsectors those costs may be considered particularly significant.

Insufficient information is available to indicate, except in a very general way, the characteristics of businesses that view telecommunication costs as being particularly important. For example, information-intensive Canadian businesses are among those to be so characterized. In addition, concern for telecommunication costs can be especially acute for businesses whose main competition comes from US firms that have significantly lower telecommunication costs, especially lower long-distance costs.

While telecommunication costs are not always a critical factor, the availability of high quality, technologically advanced telecommunication products and services is essential to all businesses. In this respect, the efficient and cost-effective delivery of all forms of business communications is a critical role played by the telecommunications industry in supporting Canadian business. Little evidence is currently available to establish the direct role of telecommunications pricing in technological and service innovation. Other factors such as customer demand, competitive pressures, technological development and regulatory requirements have played a significant and possibly greater role.

CHAPTER 7

ENDNOTES

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CHAPTER 7

APPENDIX

Statistics Canada Input-Output Tables, 1981: Expenditures by Canadian Industries on Telephone & Telegraph Services

TABLE A.1
Expenditures by Canadian Industries on Telephone and Telegraph Services, Ranked by Amount (1981)

Industry	Telephone & Telegraph Expenditure	Total Expenditure	% Total Expenditures devoted to Telephone and Telegraph
	($ millions)		
Other Fin. Ins. & Real Es	555	27303	2.033
Wholesale Trade	461	22301	2.067
Retail Trade	335	28560	1.173
Health Services	209	7082	2.951
Banks & Credit Unions	201	7078	2.84
Misc. Services to Busines	191	8083	2.363
Rwy Transport	148	5554	2.665
Truck Transport	132	7906	1.67
Accommodation & Food Serv	123	13832	0.889
Communication Industries	106	7930	1.337
Radio & TV Broadcasting	87	1676	5.191
Prof. Services to Busines	87	7227	1.204
Insurance	81	4691	1.727
Agriculture	70	18204	0.385
Printing & Publishing	58	6189	0.937
Air Transport	56	4857	1.153
Industrial Chem. Mfrs.	42	5335	0.787
Water Transport	40	2770	1.444
Misc Machinery & Equip	35	5966	0.587
COMMUNICATIONS EQUIP	27	3052	0.885
Aircraft & Parts Mfrs	26	2819	0.922
Motor Vehicle Mfrs	26	11600	0.224
Services Incidental to Tr	26	1951	1.333
Pulp & Paper	24	11824	0.203
Other Recreat Services	24	2437	0.985
Petroleum & Gas Wells	22	18190	0.121
Petroleum Refineries	22	20650	0.107
Res. Construction	21	13184	0.159
Non-res. Construction	21	12697	0.165
Mfrs of Elect Indust Equi	19	1926	0.987
Advertising Services	18	794	2.267
Iron & Steel Industry	16	6979	0.229
Metal Stamp. Press & Co.	16	3520	0.455
Other Chem. Industries	16	2023	0.791
Slaughtering & Meat Proc	15	7579	0.198
Clothing Industries	15	4157	0.361
Services Incidental to M	14	3733	0.375
Plastic Fabricators	14	2507	0.558
Road & Hwy Construction	14	3247	0.431
Pipeline Transport	14	2091	0.67
Gas Distribution	14	1100	1.273
Other Personal Services	14	1454	0.963
Misc. Food Industries	13	3252	0.4

Smelting & Refining	13	6231	0.209
Scientific & Prof. Equip.	13	1496	0.869
Sawmills	12	5088	0.236
Repair Construction	12	9668	0.124
Office & Store Machinery	11	1400	0.786
Dairy Factories	10	4820	0.207
Other Rubber Indust	10	2136	0.468
Sashing, Door & Planing	10	1775	0.563
Paper Box & Bag Mfr	10	2313	0.432
Misc Metal Fabricating	10	1608	0.622
Shipbldg & Repair	10	1101	0.908
Plast. & Synth. Mfrs.	10	956	1.046
Gas & Oil Facility Constr	10	7954	0.126
Misc Electr Products Mfrs	9	1214	0.741
Pharm. & Medic. Mfrs.	9	1401	0.642
Feed Mfgrs.	8	2563	0.312
Other Paper Converters	8	1557	0.514
Motor Veh Pts & Access	8	4446	0.18
Electric Power	8	10181	0.079
Forestry	7	4584	0.153
Oramental & Arch Metal	7	1191	0.588
Agricultural Implement I	7	1409	0.497
Major Appliances Elect. &	7	901	0.777
Dams & Irrigation Project	7	4716	0.148
Other Engineering Constr.	7	4645	0.151
Construction - other	7	358	1.955
Storage	7	828	0.845
Fish Products Industries	6	1764	0.34
Fruit & Vegetable Process	6	1758	0.341
Fabricated Struct Metal	6	1444	0.416
Hardware Tool & Cutlery	6	1045	0.574
Mfrs of Electr Wire & Cab	6	1339	0.448
Paint & Varnish Mfrs.	6	817	0.734
Taxicab Operations	6	732	0.82
Post Office	6	1514	0.396
Base Metal & Other	5	3655	0.137
Soft Drink Mfg.	5	1326	0.377
Breweries	5	1449	0.345
Synthetic Textile Mill	5	1323	0.378
Household Furniture Indu	5	1447	0.346
Aluminum Rolling & Extru	5	727	0.688
Wire & Wire Products Mfg	5	1542	0.324
Toilet Prep. Mfrs.	5	613	0.816
Misc. Mfg. Industries	5	689	0.726
Iron Mines	4	1873	0.214
Bakeries	4	1401	0.286
Distilleries	4	690	0.58
Carpet Mat & Rug	4	659	0.607
Misc Textile	4	1388	0.288
Office Furniture	4	510	0.784
Boiler & Plate Works	4	829	0.483
Machine Shops	4	700	0.571
Truck Body & Trailer Mfrs	4	1002	0.399
Radio & Telev Receivers	4	461	0.868

Concrete Products	4	656	0.61
Glass & Gl. Products	4	817	0.49
Urban Transit Systems	4	737	0.543
Education & Related Servi	4	894	0.447
Motion Picture Theatres	4	813	0.492
Laundries & Cleaners	4	930	0.43
Misc. Repair & Maintenanc	4	1290	0.31
Coal Mines	3	912	0.329
Flour & Breakfast Cereal	3	1155	0.26
Confectionery Mfrs.	3	916	0.328
Tobacco Products Mfrs.	3	1077	0.279
Shoe Factories	3	722	0.416
Other Knitting Mills	3	785	0.382
Other Furniture	3	794	0.378
Steel Pipe & Tube Mills	3	1337	0.224
Heating Equipment Mfrs	3	389	0.771
Misc Transp. Equip	3	379	0.792
Cement Mfrs	3	711	0.422
Ready Mix Concrete	3	1120	0.268
Other Non-Metallic Produc	3	745	0.403
Soap & Cleanin. Mfrs.	3	983	0.305
Sporting Goods & Toy Indu	3	781	0.384
Other Non-Metal Mines	2	1279	0.156
Poultry Processors	2	1124	0.178
Sugar Refineries	2	851	0.235
Vegetable Oil Mills	2	862	0.232
Small Leather Goods Mfr	2	268	0.746
Cotton Yarn & Cloth Mill	2	789	0.253
Veneer & Plywood Mills	2	847	0.236
Misc Wood Industries	2	574	0.348
Engraving & Stereotyping	2	384	0.521
Iron Foundries	2	537	0.372
Copper & Alloy Rolling	2	596	0.336
Metal Casting & Extruding	2	560	0.357
Comm Refrig & Air Cond.	2	322	0.621
RR Rolling Stock	2	1127	0.177
Small Electrical Applianc	2	424	0.472
Clay Products	2	212	0.943
Jewelry & Silverware Mfrs	2	691	0.289
Linoleum & Coated Fabric	2	249	0.803
Signs & Displays Industri	2	336	0.595
Bus Transport -Interurban	2	260	0.769
Photography	2	439	0.456
Fishing, Hunting & Trappi	1	915	0.109
Uranium Mines	1	832	0.12
Asbestos Mines	1	598	0.167
Salt Mines	1	132	0.758
Quarries & Sand Pits	1	336	0.298
Biscuit Mfgrs.	1	450	0.222
Wineries	1	152	0.658
Rubber Footwear Mfrs	1	83	1.205
Leather Tanneries	1	208	0.481
Wool, Yarn & Cloth Mill	1	237	0.422
Canvas Products	1	104	0.962

Hosiery Mills	1	215	0.465
Wooden Box Factories	1	207	0.483
Asphalt & Related Prod	1	272	0.368
Battery Mfrs	1	304	0.329
Lime Mfrs	1	133	0.752
Refractories Mfrs	1	118	0.847
Abrasives Mfrs.	1	194	0.515
Other Petrol. & Coal Prod	1	139	0.719
Mixed Fertilizers Mfrs.	1	236	0.424
Broom, Brush & Mop Indust	1	93	1.075
Rwy., Tel & Tel Constr.	1	1415	0.071
Water & Other Utilities	1	408	0.245
Hospitals	1	210	0.476
Gold Mines	0	720	0
Gypsum Mines	0	50	0
Leaf Tobacco Process	0	367	0
Leather Glove Factories	0	40	0
Fibre Preparing Mills	0	13	0
Thread Mills	0	64	0
Cordage & Twine	0	31	0
Narrow Fabric Mills	0	83	0
Pressed & Punched Felt	0	49	0
Textile Dying & Finishing	0	136	0
Cotton & Jute Bags	0	62	0
Coffin & Casket Industry	0	34	0
Electric Lamp & Shade	0	71	0
Stone Products	0	68	0
Hwy. & Bridge Maintenance	0	162	0
Owner Occupied Dwellings	0	21077	0
Govt. Royalties on Nat. R	0	5253	0
Operating Supplies	0	9074	0
Office Supplies	0	3237	0
Cafeteria Requ	0	1258	0
Transport Margins	0	10935	0
Lab Supplies	0	1049	0
Travel & Entertainment	0	6194	0
Advertising & Promotion	0	5189	0
Machinery Repair Service	0	3723	0
SUM	**3987**	**563151**	
AVERAGE WEIGHTED BY INDUSTRY SIZE:			**0.708**
N	**189**		

TABLE A.2
Expenditures by Canadian Industries on Telephone and Telegraph Services, Ranked by Percentage (1981)

Industry	Telephone & Telegraph Expenditure	Total Expenditure	% Total Expenditures devoted to Telephone and Telegraph
	($ millions)		
Radio & TV Broadcasting	87	1676	5.191
Health Services	209	7082	2.951
Banks & Credit Unions	201	7078	2.84
Rwy Transport	148	5554	2.665
Misc. Services to Busines	191	8083	2.363
Advertising Services	18	794	2.267
Wholesale Trade	461	22301	2.067
Other Fin. Ins. & Real Es	555	27303	2.033
Construction - other	7	358	1.955
Insurance	81	4691	1.727
Truck Transport	132	7906	1.67
Water Transport	40	2770	1.444
Communication Industries	106	7930	1.337
Services Incidental to Tr	26	1951	1.333
Gas Distribution	14	1100	1.273
Rubber Footwear Mfrs	1	83	1.205
Prof. Services to Busines	87	7227	1.204
Retail Trade	335	28560	1.173
Air Transport	56	4857	1.153
Broom, Brush & Mop Indust	1	93	1.075
Plast. & Synth. Mfrs.	10	956	1.046
Mfrs of Elect Indust Equi	19	1926	0.987
Other Recreat Services	24	2437	0.985
Other Personal Services	14	1454	0.963
Canvas Products	1	104	0.962
Clay Products	2	212	0.943
Printing & Publishing	58	6189	0.937
Aircraft & Parts Mfrs	26	2819	0.922
Shipbldg & Repair	10	1101	0.908
Accommodation & Food Serv	123	13832	0.889
COMMUNICATIONS EQUIP	27	3052	0.885
Scientific & Prof. Equip.	13	1496	0.869
Radio & Telev Receivers	4	461	0.868
Refractories Mfrs	1	118	0.847
Storage	7	828	0.845
Taxicab Operations	6	732	0.82
Toilet Prep. Mfrs.	5	613	0.816
Linoleum & Coated Fabric	2	249	0.803
Misc Transp. Equip	3	379	0.792
Other Chem. Industries	16	2023	0.791
Industrial Chem. Mfrs.	42	5335	0.787
Office & Store Machinery	11	1400	0.786
Office Furniture	4	510	0.784

Major Appliances Elect. &	7	901	0.777
Heating Equipment Mfrs	3	389	0.771
Bus Transport -Interurban	2	260	0.769
Salt Mines	1	132	0.758
Lime Mfrs	1	133	0.752
Small Leather Goods Mfr	2	268	0.746
Misc Electr Products Mfrs	9	1214	0.741
Paint & Varnish Mfrs.	6	817	0.734
Misc. Mfg. Industries	5	689	0.726
Other Petrol. & Coal Prod	1	139	0.719
Aluminum Rolling & Extru	5	727	0.688
Pipeline Transport	14	2091	0.67
Wineries	1	152	0.658
Pharm. & Medic. Mfrs.	9	1401	0.642
Misc Metal Fabricating	10	1608	0.622
Comm Refrig & Air Cond.	2	322	0.621
Concrete Products	4	656	0.61
Carpet Mat & Rug	4	659	0.607
Signs & Displays Industri	2	336	0.595
Ornamental & Arch Metal	7	1191	0.588
Misc Machinery & Equip	35	5966	0.587
Distilleries	4	690	0.58
Hardware Tool & Cutlery	6	1045	0.574
Machine Shops	4	700	0.571
Sashing, Door & Planing	10	1775	0.563
Plastic Fabricators	14	2507	0.558
Urban Transit Systems	4	737	0.543
Engraving & Stereotyping	2	384	0.521
Abrasives Mfrs.	1	194	0.515
Other Paper Converters	8	1557	0.514
Agricultural Implement I	7	1409	0.497
Motion Picture Theatres	4	813	0.492
Glass & Gl. Products	4	817	0.49
Wooden Box Factories	1	207	0.483
Boiler & Plate Works	4	829	0.483
Leather Tanneries	1	208	0.481
Hospitals	1	210	0.476
Small Electrical Applianc	2	424	0.472
Other Rubber Indust	10	2136	0.468
Hosiery Mills	1	215	0.465
Photography	2	439	0.456
Metal Stamp. Press & Co.	16	3520	0.455
Mfrs of Electr Wire & Cab	6	1339	0.448
Education & Related Servi	4	894	0.447
Paper Box & Bag Mfr	10	2313	0.432
Road & Hwy Construction	14	3247	0.431
Laundries & Cleaners	4	930	0.43
Mixed Fertilizers Mfrs.	1	236	0.424
Cement Mfrs	3	711	0.422
Wool, Yarn & Cloth Mill	1	237	0.422
Fabricated Struct Metal	6	1444	0.416
Shoe Factories	3	722	0.416
Other Non-Metallic Produc	3	745	0.403
Misc. Food Industries	13	3252	0.4

Truck Body & Trailer Mfrs	4	1002	0.399
Post Office	6	1514	0.396
Agriculture	70	18204	0.385
Sporting Goods & Toy Indu	3	781	0.384
Other Knitting Mills	3	785	0.382
Synthetic Textile Mill	5	1323	0.378
Other Furniture	3	794	0.378
Soft Drink Mfg.	5	1326	0.377
Services Incidental to M	14	3733	0.375
Iron Foundries	2	537	0.372
Asphalt & Related Prod	1	272	0.368
Clothing Industries	15	4157	0.361
Metal Casting & Extruding	2	560	0.357
Misc Wood Industries	2	574	0.348
Household Furniture Indu	5	1447	0.346
Breweries	5	1449	0.345
Fruit & Vegetable Process	6	1758	0.341
Fish Products Industries	6	1764	0.34
Copper & Alloy Rolling	2	596	0.336
Coal Mines	3	912	0.329
Battery Mfrs	1	304	0.329
Confectionery Mfrs.	3	916	0.328
Wire & Wire Products Mfg	5	1542	0.324
Feed Mfgrs.	8	2563	0.312
Misc. Repair & Maintenanc	4	1290	0.31
Soap & Cleanin. Mfrs.	3	983	0.305
Quarries & Sand Pits	1	336	0.298
Jewelry & Silverware Mfrs	2	691	0.289
Misc Textile	4	1388	0.288
Bakeries	4	1401	0.286
Tobacco Products Mfrs.	3	1077	0.279
Ready Mix Concrete	3	1120	0.268
Flour & Breakfast Cereal	3	1155	0.26
Cotton Yarn & Cloth Mill	2	789	0.253
Water & Other Utilities	1	408	0.245
Veneer & Plywood Mills	2	847	0.236
Sawmills	12	5088	0.236
Sugar Refineries	2	851	0.235
Vegetable Oil Mills	2	862	0.232
Iron & Steel Industry	16	6979	0.229
Steel Pipe & Tube Mills	3	1337	0.224
Motor Vehicle Mfrs	26	11600	0.224
Biscuit Mfgrs.	1	450	0.222
Iron Mines	4	1873	0.214
Smelting & Refining	13	6231	0.209
Dairy Factories	10	4820	0.207
Pulp & Paper	24	11824	0.203
Slaughtering & Meat Proc	15	7579	0.198
Motor Veh Pts & Access	8	4446	0.18
Poultry Processors	2	1124	0.178
RR Rolling Stock	2	1127	0.177
Asbestos Mines	1	598	0.167
Non-res. Construction	21	12697	0.165
Res. Construction	21	13184	0.159

Other Non-Metal Mines	2	1279	0.156
Forestry	7	4584	0.153
Other Engineering Constr.	7	4645	0.151
Dams & Irrigation Project	7	4716	0.148
Base Metal & Other	5	3655	0.137
Gas & Oil Facility Constr	10	7954	0.126
Repair Construction	12	9668	0.124
Petroleum & Gas Wells	22	18190	0.121
Uranium Mines	1	832	0.12
Fishing, Hunting & Trappi	1	915	0.109
Petroleum Refineries	22	20650	0.107
Electric Power	8	10181	0.079
Rwy., Tel & Tel Constr.	1	1415	0.071
Gold Mines	0	720	0
Gypsum Mines	0	50	0
Leaf Tobacco Process	0	367	0
Leather Glove Factories	0	40	0
Fibre Preparing Mills	0	13	0
Thread Mills	0	64	0
Cordage & Twine	0	31	0
Narrow Fabric Mills	0	83	0
Pressed & Punched Felt	0	49	0
Textile Dying & Finishing	0	136	0
Cotton & Jute Bags	0	62	0
Coffin & Casket Industry	0	34	0
Electric Lamp & Shade	0	71	0
Stone Products	0	68	0
Hwy. & Bridge Maintenance	0	162	0
Owner Occupied Dwellings	0	21077	0
Govt. Royalties on Nat. R	0	5253	0
Operating Supplies	0	9074	0
Office Supplies	0	3237	0
Cafeteria Requ	0	1258	0
Transport Margins	0	10935	0
Lab Supplies	0	1049	0
Travel & Entertainment	0	6194	0
Advertising & Promotion	0	5189	0
Machinery Repair Service	0	3723	0
SUM	**3987**	**563151**	
AVERAGE WEIGHTED BY INDUSTRY SIZE:			**0.708**
N	**189**		

CHAPTER 8

Telecommunication Costs and the Overall Economic Impact of Alternative Rate Structures

CHAPTER 8

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8.1 Introduction

This chapter considers the impact of changes in the level of long-distance and local rates on (1) macroeconomic indicators such as Gross National Product (GNP) and tax revenues, and (2) consumer surplus. As background to this discussion, the chapter first reviews the ongoing debate as to the appropriate costing and pricing of telecommunication services. Both sides of the debate are presented and its relationship to measuring the impact of changes in long-distance and local rates is considered.

8.2 The Costing and Pricing of Telecommunication Services

The question of how best to calculate the costs of providing telecommunication services is one that has been the subject of lengthy and extensive discussion. This results from a number of factors, including the fact that several different services are often provided using the same capital and labour inputs, and various definitions of "costs" exist. Furthermore, costing information may be sought for a variety of purposes and the information relevant to one purpose may differ from that considered relevant to another. Insofar as, for the purposes of this analysis at least, costing information is primarily relevant to an assessment of the pricing of telecommunication services, the types of costing information required will depend upon what criteria are to be used in that assessment.

In the view of mainstream economists, the normative function of prices is to send signals to producers as to how much of a product to produce and to allocate output among consumers based on the value attached by them to different goods. According to this viewpoint, setting the price of a good equal to its marginal cost ensures that additional units of a good are produced if and only when the value of that unit is at least as great as the value of the inputs used in its production. Where prices are established in excess of marginal cost consumption is discouraged, even where the value attached to additional production exceeds its cost. Conversely, where prices are set below marginal cost, excessive consumption is encouraged. In this way the net value of society's output is maximized as a result of marginal-cost pricing.

Opponents of this view dispute it on several grounds. First, they argue that prices should be established to allocate goods and services based on criteria other than just economic efficiency. They contend, for instance, that the notion of economic efficiency is overly narrow, and that prices for some services should be lowered to ensure their availability to low-income or other individuals or to promote their utilization. Countering this view, some economists argue that the price system should not be used to promote such non-economic goals, but that the governmental tax and expenditure system is more appropriate to promote these other ends.

Secondly, critics argue that for some goods, use by one group of individuals creates value for others (called "externalities") and in these circumstances economically efficient pricing requires that the price of such goods be set below marginal cost. While traditional economists often accept this proposition as theoretically correct, they tend to doubt the widespread existence of externalities of any significant magnitude.

Thirdly, opponents of the traditional view argue that in industries without constant unit costs, marginal-cost pricing will lead to excessive profits or losses and, in the case of regulated utilities, pricing on the basis of forward-looking costs for all services would be unlikely to yield revenues equal to the revenue requirement calculated by the regulator (generally on an embedded-cost basis). Economists usually allow for this difficulty but maintain -- employing a theory known as "Ramsey pricing" -- that where marginal-cost pricing cannot be employed, economic efficiency will be promoted if deviations from marginal-cost pricing are least for those goods and services for which consumer demand is most price elastic. Finally, critics of marginal-cost pricing maintain that the concept is not operational and should be ignored on the basis of the practical difficulties inherent in calculating such costs.

With regard to the costing and pricing of telecommunication services, certain of these issues have been more fully recognized and debated than others. One widely held view is that of Alfred Kahn,[1] an internationally recognized economist in the area of regulatory theory. He argues that inefficiencies in existing telecommunications pricing policies fall into three categories, namely:

1. Rates are averaged with respect to such factors as geography.

2. The long-distance network is underutilized, while the local network is overutilized.

3. Flat-rate local service results in excessive local calling as measured by the number of calls placed, the value of which is less than the costs imposed by those calls on society.*

Dealing with each of the above in turn, the first suggests that rate averaging will result in rates in specific locations or for specific users that differ from underlying costs and thus lessen economic efficiency. The second suggests that long-distance service is overpriced while local service is underpriced, and that this inhibits the use of long-distance service and may even result in excessive use of local service. The third suggests that within the local rate structure, the failure to charge for local usage may lead to excessive local calling. Kahn suggests that an efficient telecommunications pricing system would charge each user a two-part tariff: The first part would be a fixed charge to recover the non-traffic sensitive costs associated with connecting the customer to the existing system. Such a charge would vary among customers depending upon, for instance, their location. The second part would vary with network usage and would reflect such factors as duration of the call and time of day.

A countervailing view is held by Ben Johnson.[3] He argues that because non-traffic sensitive costs are used to provide long-distance and local service, they should be recovered from both of these services. Secondly, he maintains that a "policy of recovering costs from those who cause them is meaningful only in the context of marginal costs,"[4] and that most non-traffic sensitive costs cannot be avoided by alternative courses of action and thus should be considered fixed. He further argues that a Ramsey price approach, whereby long-distance rates are set at or near marginal costs while local rates are set so as to recover any residual revenue requirement (on the basis that the demand for local service is relatively more inelastic than long-distance), is a patently one-sided approach. He also contends that marginal costs, in both the short and long run, are far less than the conventional wisdom would indicate.

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* With regard to Kahn's position on measured-rate local pricing, a recent Rand Corporation research report[2] concluded that measured-rate pricing of local telephone calls is likely to be somewhat less efficient than traditional flat-rate pricing.

Finally, he suggests that the connection of individuals to the network confers an externality on others and thus justifies, even on economic efficiency grounds, the provision of local service at prices below marginal costs.

A variety of approaches have been recommended by those who do not support Kahn's view and prefer instead the traditional approach of recovering some access costs from long-distance services. These include the Idaho Public Utilities Commission's[5] finding in case No.U-1500-153 that 50 per cent of access costs should be recovered from local services, with 25 per cent being recovered from each of inter- and intra-state long-distance services.* While the implications of such an approach being adopted in Canada cannot at this time be estimated with precision, the modified five-way split cost evidence of Bell Canada and British Columbia Telephone would indicate that, in their case, less than one-third of access costs are currently being recovered through local service rates. Some questions remain, however, as to the accuracy of such estimates.

In view of the magnitude and controversial nature of these issues, no attempt has been made to resolve them in this examination. Still, in assessing the consumer surplus and macroeconomic impact estimates contained in this chapter, certain points raised in the debate may be noted. In particular, it should be realized that neither the consumer surplus nor the macroeconomic impact calculations speak to non-economic issues such as those discussed in Chapter 4. Furthermore, these studies are based on specific assumptions as to marginal costs concerning which it has been noted that considerable disagreement exists. In the absence of fuller knowledge as to the reasonableness of such assumptions, the specific estimates produced by these studies must be viewed with caution.

8.3 Macroeconomic Impacts of Changes to Long-Distance and Local Rates

This section presents the results of a number of studies that have been undertaken to assess the macroeconomic impact of specified telecommunications price changes. The models utilized in these studies trace through the effects of such price changes by examining their impact on business and consumer demands for telecommunications and other services, including those for which telecommunica-

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* In the case of inter state service, the Federal Communications Commission (FCC) recovers a portion of such costs assigned to long-distance service through an end-user charge that is conceptually equivalent to a flat monthly local rate surcharge.

tions is a cost input and whose prices would be affected by changing telecommunication costs.

Altered demand in response to price changes has an impact on other economic variables as well, such as employment levels and interest rates. The models used in the studies considered here incorporate detailed specifications of the relationships among these economic variables. The accuracy of estimates obtained from such models will, of course, depend on the accuracy with which these relationships are specified and the size of the initial price changes considered.

Macroeconomic calculations of the effect of changes in telecommunications rate structures differ according to whether a requirement is imposed that the changes be self-financing. The Wharton study[6] and the D.A. Ford study[7] are examples of studies that do not impose such a requirement. In the other studies presented in this section, however, the initial set of price changes involve long-distance rate reductions which are offset by local or other rate increases, themselves having a macroeconomic impact and which are necessary to ensure no change in telephone company profitability. A brief overview of some of these studies is provided below.

Wharton study (1984)

This study provides an evaluation of the macroeconomic implications in the United States of reduced long-distance rates arising from deregulation. The findings of the study were that, assuming a 10 per cent reduction in long-distance prices, real US Gross National Product (GNP) over the 1984 to 1993 period would increase by $71 billion;* employment would increase by 400 000; the price index would fall by 1.3 per cent by 1993; the cumulative increase in net real merchandise exports would be $6.7 billion; real personal disposable income would increase by as much as $43.8 billion; real consumer spending on telecommunications would increase by $4.2 billion; real fixed business investment would increase by $11.1 billion; and the US federal debt would fall by $10.3 billion. For larger and smaller long-distance price cuts, the general conclusion reached was that changes in economic indicators would move more than proportionately with increases in the size of the price cut.

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* All dollar amounts in the Wharton study are expressed in 1972 US dollars.

Informetrica study (1984)

A 1984 study by Informetrica assessed the macroeconomic effects on the Canadian economy of Bell's proposed rate rebalancing plan.[8] That plan would entail raising local rates by in excess of 100 per cent, and decreasing long-distance rates by more than 50 per cent over a five-year period from 1984 to 1989. The study assumed that comparable rate changes would transpire throughout all provinces over the same time period. It estimated that such a rate rebalancing plan would result in a $2 billion annual increase in real GNP by 1989 (1983 dollars). It also estimated that the average price of telecommunications would be 11 per cent lower by 1989 — 10.3 per cent higher for residence and 22 per cent lower for business service. The reduction in average price reflects the increased use of long-distance relative to local service that was expected to result. In addition, the study determined that the unemployment rate would decrease by 0.07 per cent; the consumer price index would fall by 0.2 per cent (with the effect of lower business costs outweighing higher residential telecommunication costs); and the government deficit would fall by $900 million because of lower interest rates, lower inflation and an increased tax base.

Both the Wharton study and the Informetrica study were commissioned by telephone companies and relied upon assumptions provided by them as to marginal costs and demand elasticities. The direction of the results obtained flows from the assumptions that: (a) the elasticity of demand for long-distance service exceeds that for local service, (b) long-distance rates exceed marginal costs and, to a lesser extent, (c) local rates are less than the marginal cost of adding subscribers to the network.

D.A. Ford study using Informetrica models (1986)

An alternative study was undertaken by Informetrica on behalf of D.A. Ford and Associates and is discussed in Chapter 7. In that study, it was found that changing Canadian local and long-distance telecommunication rates paid by businesses to US levels would imply a reduction in average telecommunication rates and lead to increases of from 0.09 to 0.22 per cent in annual gross national expenditures, decreases of approximately 0.1 per cent in the unemployment rate and decreases of from 0.2 to 0.4 per cent in the inflation rate. The provinces were expected to share in such gains, though not all to the

same extent. In interpreting the results, however, it should be noted that these estimates do not take into account negative effects on the economy of the rate increases that would be necessary to offset the effect on telephone company revenues of lower rates to business customers. The overall economic impact of a set of self-financing rate changes thus cannot be inferred from the study.

8.4 Impact of Long-Distance and Local Rate Changes on Consumer Surplus

Consumer surplus is defined by economists as the difference between the price that consumers would be willing to pay for a service and the amount they actually do pay for that service. The resulting change in the amount of total consumer surplus is a measure of the change in value to society resulting from a change in prices such as those for long-distance and local telephone services. Reductions in long-distance rates result in increased consumer surplus, while increases in local rates result in decreased consumer surplus. For a given set of rate changes, provided the increase in consumer surplus exceeds the decrease in consumer surplus, a net economic benefit accrues to society as a whole.

Were long-distance rates to decline, the consumer surplus from long-distance service would increase, for two reasons: First, users would pay less for their existing volume of long-distance calling. Second, they would likely make additional long-distance calls, the perceived value of which would be less than the former rate but above the new rate. Increases in local rates to offset the impact on revenues of long-distance rate decreases would result in decreases to consumer surplus, fully or partially offsetting increases resulting from lower long-distance rates. The net effect would depend, of course, on the relative elasticity of demand for the two services.

Peat, Marwick and Partners[9] estimated the net benefits that would be derived by telephone subscribers as a result of changes in telephone service rates. The concept "consumer surplus" was used as a measure of those net benefits. While it was assumed that local rate increases would be applied uniformly to both residence and business rates, the model for estimating changes in consumer surplus was run separately for the residential and the business sectors. The model assumed that the changes in rates had been applied gradually from 1980 to 1982.*

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* The findings in the Peat Marwick study all relate to 1982.

Assumptions regarding the business sector included the following: (1) any accrued benefits would be passed on to consumers in the form of lower prices; and (2) no business subscribers would completely drop off the system because of higher rates. Some would, however, reduce local usage by having fewer main lines. In view of the existence of flat-rate local pricing, the model assumed no change in local usage for residential consumers who did not drop telephone service. For both sectors, it estimated the increase in call minutes that would result from lower long-distance rates.

The three scenarios examined by Peat Marwick involved across-the-board long-distance rate reductions of 10, 20 and 40 per cent, together with associated local rate increases. The main finding of the study was that the increase in consumer surplus caused by the reduction in average long-distance rates would, for each province and for Canada as a whole, be greater than the decline in consumer surplus caused by an accompanying increase in local rates. The explanation for this phenomenon was assumed to lie in the difference between the elasticity of demand for long-distance services, as compared with that for local services. In other words, the sensitivity of the demand for local service to changes in the price of local service was assumed to be lower than the sensitivity of the demand for long-distance service to changes in the price of that service.

The study also concluded that the more radical the long-distance rate reductions, the higher the resultant gains in consumer surplus would be. The net gain in consumer surplus corresponding to a 40 per cent across-the-board long-distance rate reduction would be $0.69 billion across Canada for the year 1982. The gains corresponding to 20 per cent and 10 per cent reductions would be $0.42 billion and $0.22 billion, respectively.

The authors of the study argued that the general conclusions reached for 1982 would not change much in relative terms by 1990. In other words, although the study produced results for only one year, the authors felt that the information concerning the relative benefits derived from alternative scenarios for 1982 could be extrapolated to the future.

For both the 40 per cent and the 20 per cent long-distance rate reduction scenarios, Peat Marwick found that consumer surplus gains would be highest for Ontario, followed by Quebec, British Columbia, Alberta, Saskatchewan, Manitoba, Nova Scotia, Newfoundland and New Brunswick. The result was the same for the 10 per cent long-distance rate reduction scenario, with the

exception that gains were greater for Nova Scotia than for Manitoba. The smallest impact was found to occur in New Brunswick, though this impact remained positive.

While the model for estimating changes in consumer surplus was run separately for the residential and business sectors, and while the study presented the raw data representing the results of these two runs, it fell short of drawing explicit conclusions from the individual residential and business results. The study does, however, state that:

> Businesses are typically heavy users of long distance telephone services, accounting for twice as much toll traffic per main line as residential subscribers in several provinces.
>
> Obviously a rebalancing of rates... will benefit the above-average users of toll services more than the below-average users. Businesses and in particular large businesses, are in the former category.[10]

At the same time, data included in the study suggest that while the average business stands to gain more consumer surplus from a lowering of long-distance with an associated increase in local rates than the average residential subscriber, the aggregate residential sector stands to gain more than the aggregate business sector. This is presumably due to differences in the relative numbers of subscribers in each sector.

The study's overall conclusions were that a lowering of long-distance rates, with consequent local rate increases, would result not only in a significant net increase in the volume of services provided by the telephone companies. It would also increase consumer surplus for society as a whole. The specific quantitative conclusions arrived at reflect the authors' assumptions as to demand elasticities and their estimates of the marginal costs of service provision.

Similar results were arrived at in the United States by the National Telecommunication and Information Administration (NTIA) in their comments in FCC CC Docket 80-286.[11] They concluded that an annual gain of $1.6 billion (in 1981 US dollars) would be generated by shifting the recovery of all access to local rates.

Melvyn Fuss and Leonard Waverman[12] also investigated the welfare aspects of Bell Canada's rate structure together with several alternative structures, for the years 1952-1978, using data drawn from the company's financial accounts. They found that long-distance rates generally exceed their marginal costs, while local service rates fall short of their marginal costs. In fact, the Bell data suggested that the actual pricing structure is far from either of the pricing schemes generally reputed to be "efficient" -- namely, marginal-cost pricing for firms subject to constant return-to-scale and Ramsey pricing, where returns to scale are not constant.

While equity considerations can dictate departures from efficient pricing schemes, Fuss and Waverman maintained that the structure of Bell Canada's prices was so inefficient that equity would have to imply social welfare weights that were strongly dominated by local service users in order to rationalize it. They also estimated the effects of alternative rate structures on prices, outputs and marginal costs. The rate structures examined reflected marginal-cost pricing and Ramsey pricing in accordance with the authors' cost and demand estimates. Preliminary simulations indicated that marginal-cost pricing would result in decreases of between 50 and 70 per cent in long-distance prices. Even more extreme price and output changes were considered under Ramsey pricing. Fuss and Waverman found that here the relative price variance between long-distance and local services would have to change by about 800 per cent (i.e. local increasing, long-distance decreasing).

The study then proceeded to examine what the required increase in local service rates would be if long-distance rates, other than for private lines, were reduced by 20 per cent and if Bell were allowed to earn the same level of profits as before the rate change. It was estimated that a 15 per cent increase in local rates would be required under these circumstances. Long-distance output was found to increase by 35 per cent, whereas local service output was found to decrease by 3 per cent. The fact that such a large increase in long-distance output required only a small decrease in local service output was taken as confirmation that total welfare would be improved by adjusting local and long-distance rates closer to their marginal costs.

8.5 Conclusions

This chapter has reviewed a number of issues related to the costing and pricing of telecommunication services and the overall economic impact of alternative rate structures. With respect to costing, it is apparent that there are a number of competing views as to the appropriateness of alternative costing methodologies. These disputes centre around the extent to which non-traffic sensitive costs should be recovered through rates for long-distance and local services. Also in dispute is the extent to which non-economic factors should be considered in the costing process, and the operationality of certain economic concepts of costs. No attempt has been made in the context of the current exercise to resolve these differences.

The remainder of the chapter reviewed studies that estimate the macroeconomic impact, or the impact on consumer surplus, of alternative rating structures. While the specific results of the studies available to the examination should be considered with caution, these studies forecast that a lowering of long-distance rates, together in some cases with offsetting local rate increases, would bring overall economic benefits.

CHAPTER 8

ENDNOTES

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3. Johnson, Ben, "Universal Local Access Service Tariffs: An Alternative Approach to Carrier Access Charges." Paper presented at the Seventeenth Williamsburg Conference sponsored by Michigan State University, 1985.

4. Ibid.: p.6.

5. Idaho Public Utilities Commission, "In the Matter of the Allocation of Non-Traffic Sensitive Costs Between Interlata and Intralata Intrastate Telephone Service," Case No.U-1500-153, Order No.20182, December 1985.

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7. D.A. Ford and Associates Ltd., "The Impact of International Competition on the Canadian Telecommunications Industry and Its Users." Report commissioned by the Department of Communications and provincial governments, Draft Report, April 1986.

8. Informetrica Limited, "The Macroeconomic Impacts of Bell's Rate Restructuring Proposal." Report commissioned by Bell Canada, November 1984.

9. Peat, Marwick and Partners, "Impacts of Competition in Message Toll Telephone Services." Report commissioned by the Department of Communications and provincial governments, September 1984.

10. Ibid.: p.vii-1.

11. United States Department of Commerce. National Telecommunications and Information Administration, "Comments to the Federal-State Joint Board," in Federal Communications Commission CC Docket 80-286, August 1981.

12. Fuss, Melvyn and Leonard Waverman, The Regulation of Telecommunications in Canada. Technical Report No.7 of the Economic Council of Canada, March 1981.

CHAPTER 9

Effects of Rate Changes on Subscriber Bills

CHAPTER 9

TABLE OF CONTENTS

9.0 Introduction

In Chapter 3, estimates are presented as to how local telephone rates could increase as a result of decreases to long-distance rates. In this chapter, those estimates, together with telephone company billing data, are used to estimate how customer bills would likely be affected under various scenarios involving changes to both local and long-distance rates. Estimates are first given as to how, under such scenarios, average customer bills would be affected and, secondly, respecting the anticipated distribution of billing increases and decreases. In comparing these results with those of Chapter 3 it should be noted that for certain expenditures different data sources were used and, consequently, minor differences may exist in some of the output data.

9.1 Analysis of Average Customer Bills

Tables 9.1 and 9.2 provide estimates, for residential and business customers, respectively, as to how average monthly customer bills would be affected under the various scenarios considered in Chapter 3. However, for the purpose of simplicity of presentation, results are given only for the following assumptions: (a) that long-distance demand elasticity is -0.8, and (b) that the impact of long-distance rate reductions is made up by equal percentage increases to business and residence local rates.* Where possible, the results are provided separately for rural and urban customers.

In the case of business customers, data were not available for all of the provinces. It also should be noted that in some instances business bills are stated on a "per customer" basis as opposed to a "per line" basis. Generally speaking, single-line business customers would be small businesses, while larger businesses would be private branch exchange (PBX) customers.

In interpreting the figures presented in this chapter, it is important to keep in mind the fact that average bills were calculated on a strict reprice basis, that is, based on applying rates under alternative scenarios to current demand levels. If, for example, an average residential subscriber currently spends $12 on local service and $18 on long-distance calling and if, under a new scenario, local rates were to increase by 10 per cent, with long-distance rates

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* Appendix A shows results for additional elasticity and rating scenarios.

TABLE 9.1
EFFECT OF LONG-DISTANCE RATE CHANGES ON AVERAGE MONTHLY RESIDENCE BILL (1985*)
(IN DOLLARS)

RATE CHANGE SCENARIO **	NFLD	P.E.I.		NOVA SCOTIA		NEW BRUNSWICK		ONT./QUE. (BELL)		MANITOBA	SASK.	ALBERTA		B.C.
		URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL			URBAN	RURAL	
STATUS QUO	36.94	30.93	28.07	33.15	31.71	32.81	30.62	28.87	27.48	22.24	35.27	39.22	42.79	33.89
REDUCE INTER-COMPANY RATES BY 10%	37.06	30.31	27.90	32.46	31.60	32.22	30.72	28.42	26.83	21.98	35.68	38.33	42.85	33.52
30%	38.42	29.83	28.27	32.14	31.98	31.58	31.59	27.85	25.73	21.91	35.09	37.25	43.72	33.39
50%	41.35	30.52	29.66	32.78	33.23	31.89	33.55	27.79	24.94	22.64	35.50	37.29	45.83	34.31
REDUCE INTER / INTRA-COMPANY RATES BY 20%/15%	38.15	30.08	27.45	32.09	30.82	31.44	30.84	27.43	24.97	21.79	34.30	37.76	41.82	33.24
50%/20%	42.28	30.78	29.06	32.73	32.15	31.51	33.42	27.00	23.29	22.62	34.29	37.41	44.09	34.31

* For NFLD Tel, Island Tel, MT&T and B.C.Tel, bill estimates are for 1986.
** Local rate increases for these scenarios are as described in Chapter 3.

TABLE 9.2
EFFECT OF LONG-DISTANCE RATE CHANGES ON AVERAGE MONTHLY BUSINESS BILL (1985*)
(IN DOLLARS)

RATE CHANGE SCENARIO **	P.E.I.		NOVA SCOTIA		NEW BRUNSWICK		ONT./QUE. (BELL)		ALBERTA	
	SINGLE LINE	PBX	SINGLE LINE	PBX	SINGLE LINE	PBX	SINGLE LINE	PBX	SINGLE LINE	PBX
STATUS QUO	68.18	145.00	64.07	182.00	96.73	836.00	149.00	4956.00	66.55	713.00
REDUCE INTER-COMPANY RATES BY 10%	68.46	147.00	64.57	181.00	95.81	815.00	146.00	4868.00	66.93	693.00
30%	71.17	157.00	66.89	184.00	95.68	785.00	144.00	4713.00	69.32	661.00
50%	77.04	174.00	72.11	192.00	98.60	774.00	145.00	4599.00	74.39	641.00
REDUCE INTER/INTRA-COMPANY RATES BY 20%/15%	69.32	151.00	65.27	179.00	94.10	781.00	142.00	4483.00	68.39	651.00
50%/20%	77.08	174.00	71.88	189.00	97.09	753.00	142.00	4097.00	75.17	609.00

* For Island Tel and MT&T. estimates are for 1986. Additionally, in interpreting the data in this table, it should be noted that for some companies data are presented on a per-line basis, while for others they are presented on a per-customer basis.

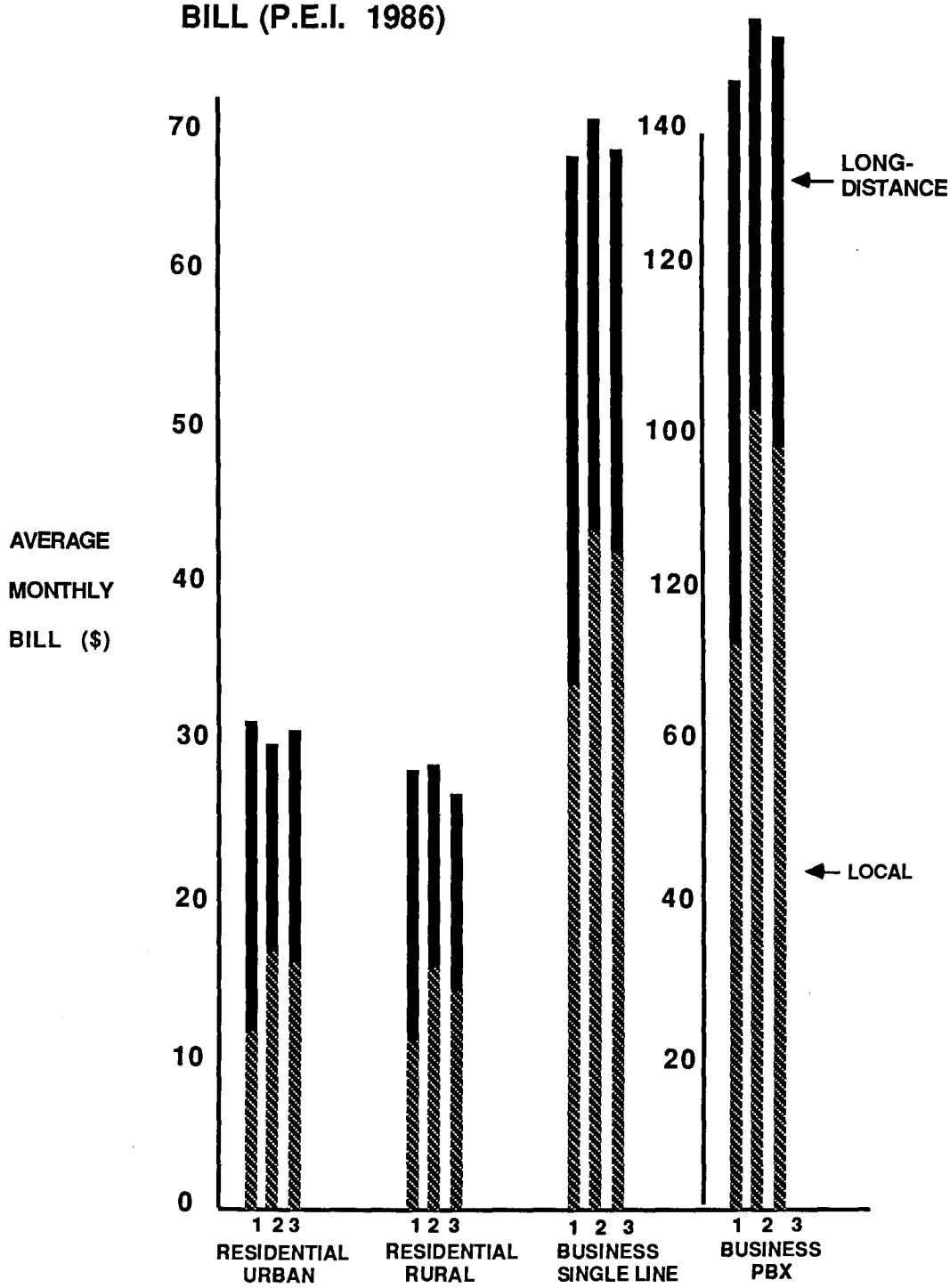
** Local rate increases for these scenarios are as described in Chapter 3.

falling by 10 per cent, the reprice bill would show local expenditures of $13.20 and long-distance expenditures of $16.20. In other words, the reprice bill would not include additional expenditures occasioned by increased demand due to changed rates. It would, however, be reasonable to expect that, while the converse need not be true, if the reprice bill were lower than the current bill the customer would prefer the reprice rates.

The results of this analysis show that for residence customers, under most scenarios average bills would not be altered dramatically in the majority of provinces -- with some showing small decreases and others showing small increases. Such increases are largest in the case of Newfoundland and for some rural subscribers, although savings would accrue to rural subscribers in Ontario and Quebec.

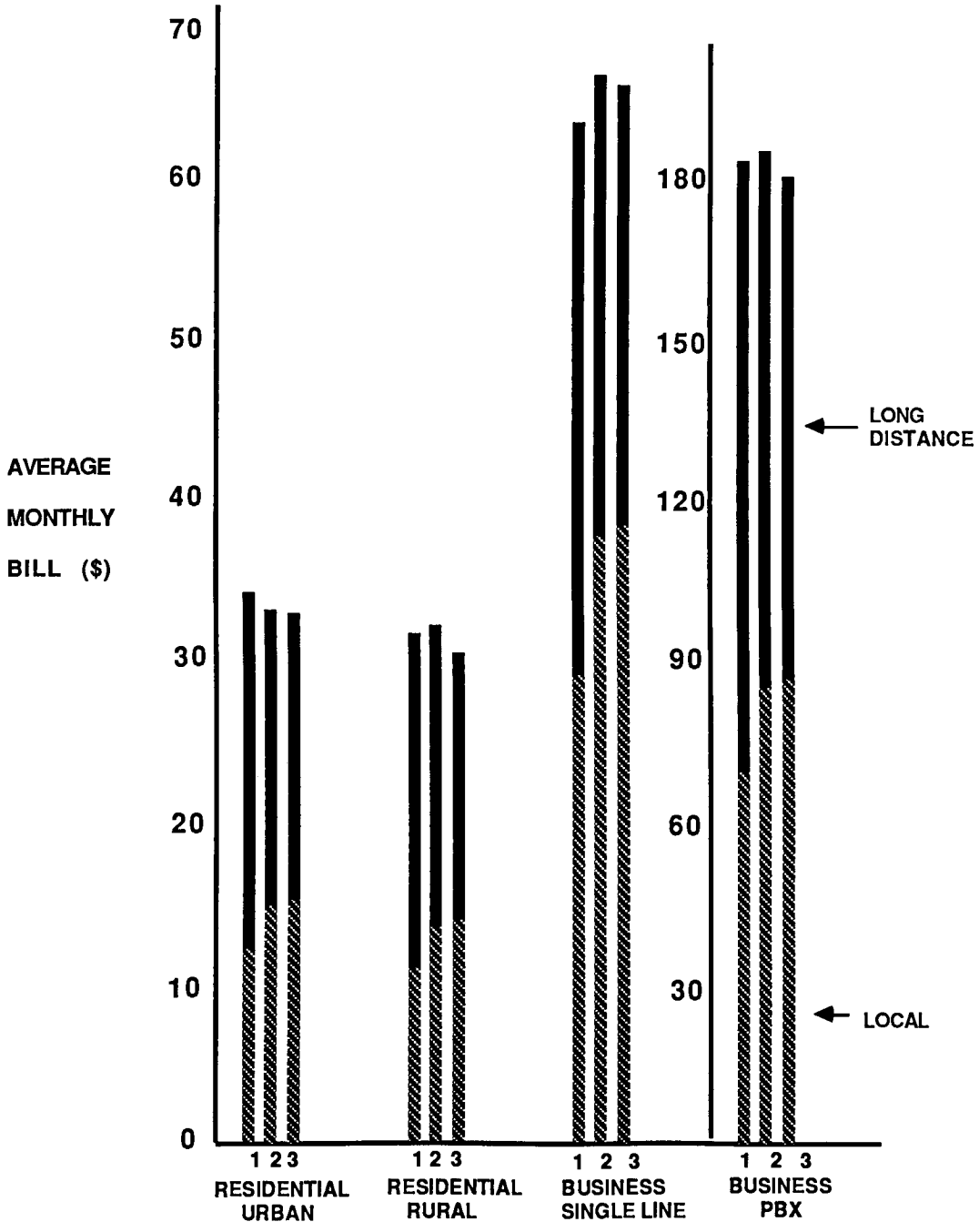
For business subscribers, single-line customers would experience relatively small increases in some provinces and small decreases in others. For PBX customers, there would be bill increases in Nova Scotia and PEI, with bill decreases in Alberta, New Brunswick, Ontario and Quebec. (These results are reproduced in graphic form in Figures 9.1 to 9.5.)

FIGURE 9.1
EFFECT OF LONG-DISTANCE (TOLL) RATE CHANGES ON AVERAGE SUBSCRIBER BILL (P.E.I. 1986)



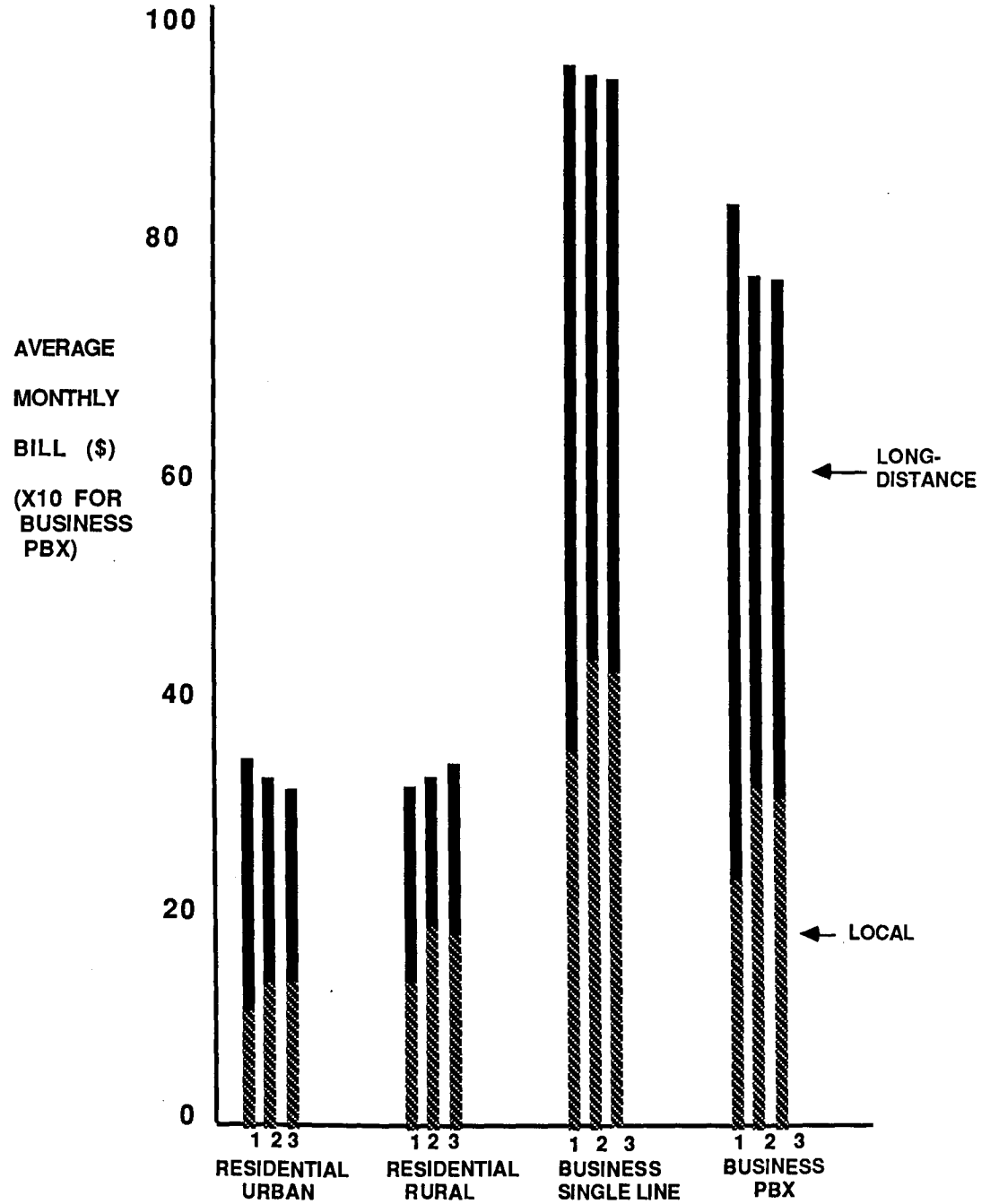
1 = STATUS QUO
2 = 30% REDUCTION IN INTER-TOLL RATES
3 = 20% REDUCTION IN INTER-TOLL RATES AND 15% REDUCTION IN INTRA-TOLL RATES

FIGURE 9.2
EFFECT OF LONG-DISTANCE (TOLL) RATE CHANGES ON AVERAGE SUBSCRIBER BILL (NOVA SCOTIA 1986)



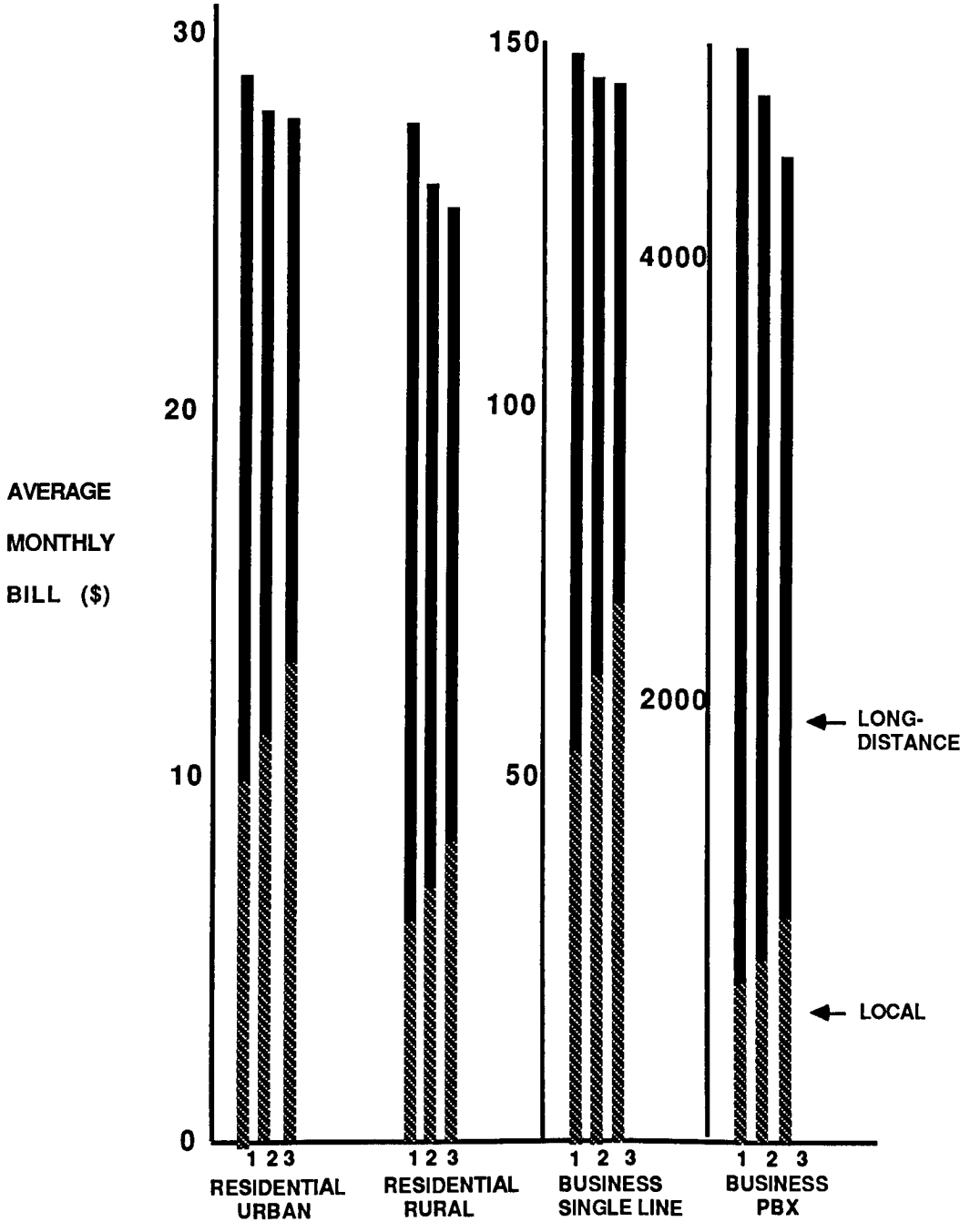
1 = STATUS QUO
2 = 30% REDUCTION IN INTER-TOLL RATES
3 = 20% REDUCTION IN INTER-TOLL RATES AND 15% REDUCTION IN INTRA-TOLL RATES

FIGURE 9.3
EFFECT OF LONG-DISTANCE (TOLL) RATE CHANGES ON AVERAGE SUBSCRIBER BILL (NEW BRUNSWICK 1985)



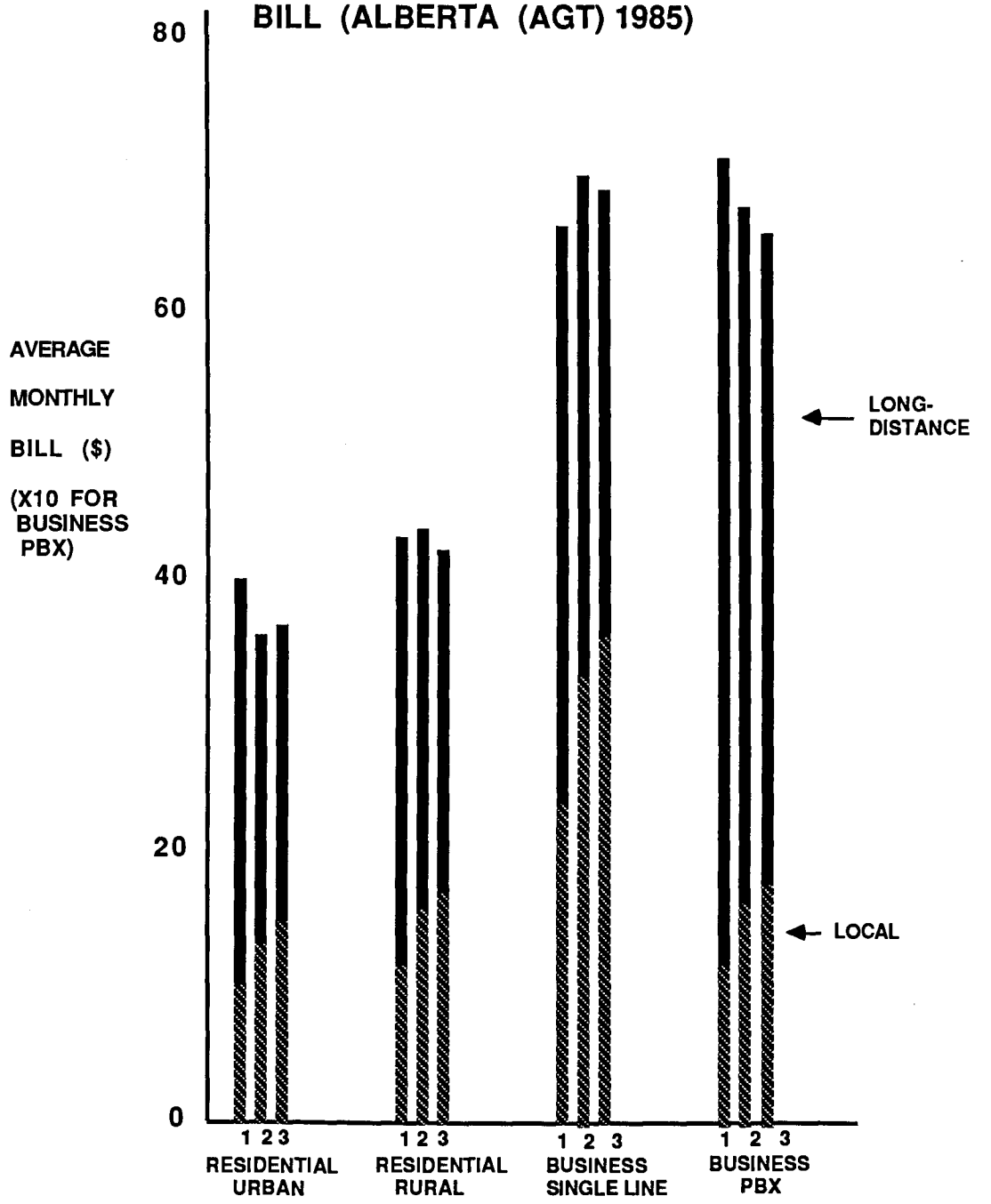
1 = STATUS QUO
2 = 30% REDUCTION IN INTER-TOLL RATES
3 = 20% REDUCTION IN INTER-TOLL RATES AND 15% REDUCTION IN INTRA-TOLL RATES-

FIGURE 9.4
EFFECT OF LONG-DISTANCE (TOLL) RATE CHANGES ON AVERAGE SUBSCRIBER BILL (ONT./QUE. (BELL CANADA) 1985)



1 = STATUS QUO
2 = 30% REDUCTION IN INTER-TOLL RATES
3 = 20% REDUCTION IN INTER-TOLL RATES AND 15% REDUCTION IN INTRA-TOLL RATES

FIGURE 9.5
EFFECT OF LONG-DISTANCE (TOLL) RATE CHANGES ON AVERAGE SUBSCRIBER BILL (ALBERTA (AGT) 1985)



1 = STATUS QUO
2 = 30% REDUCTION IN INTER-TOLL RATES
3 = 20% REDUCTION IN INTER-TOLL RATES AND 15% REDUCTION IN INTRA-TOLL RATES

9.2 Distribution of Customer Bills

The results presented above provide information as to how average customer bills would likely be altered under various rate change scenarios. Estimates were also made, by province, for each rate change scenario and applying the same assumptions as those mentioned in section 9.1, as to the distribution of residential monthly bill increases and decreases. These estimates, which are presented in detail in Appendix B, were made using telephone company data with regard to existing bill distributions, relying occasionally on some statistical interpolations from the data. In general, the estimates show that, even where a set of rate changes would lead to average bill decreases, a small majority of customers would experience small bill increases. A slight minority of customers, correspondingly, would experience somewhat larger decreases. Importantly, however, the results differ significantly among provinces.

CHAPTER 9

APPENDIX A

Effects of Rate Changes on Average Monthly Subscriber Bills

TABLE A.1
EFFECT OF LONG-DISTANCE (TOLL) RATE CHANGES ON AVERAGE MONTHLY SUBSCRIBER BILL - P.E.I. 1986
(IN DOLLARS)

SCENARIO	RESIDENTIAL URBAN			RESIDENTIAL RURAL			BUSINESS SINGLE LINE			BUSINESS PBX		
	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL
STATUS QUO	11.96	18.87	30.93	10.71	17.36	28.07	32.73	35.45	68.18	78	67	145
P.E.=-.8 (NOTE 1)												
REDUCE INTER-TOLL BY 10%	12.85	17.46	30.31	11.50	16.40	27.90	35.15	33.31	68.46	84	63	147
30%	15.40	14.43	29.83	13.79	14.48	28.27	42.15	29.02	71.17	101	56	157
50%	19.11	11.41	30.52	17.11	12.55	29.66	52.30	24.74	77.04	125	49	174
REDUCE INTER-TOLL BY 30%												
P.E.=-1.3	14.01	14.43	28.44	12.55	14.48	27.03	38.35	29.02	67.37	92	56	148
P.E.=-.4	16.38	14.43	30.81	14.67	14.48	29.15	44.82	29.02	73.84	107	56	163
P.E.=-.8												
REDUCE INTRA-TOLL FOR												
BELL AND B.C.TEL BY 10%	11.80	18.87	30.67	10.57	17.36	27.93	32.30	35.45	67.75	77	67	144
30%	11.48	18.87	30.35	10.28	17.36	27.64	31.42	35.45	66.87	75	67	142
50%	11.24	18.87	30.11	10.07	17.36	27.43	30.77	35.45	66.22	73	67	141
REDUCE INTRA-TOLL FOR												
BELL AND B.C.TEL BY 30%												
P.E.=-1.3	11.25	18.87	30.12	10.08	17.36	27.44	30.80	35.45	66.25	74	67	141
P.E.=-.4	11.74	18.87	30.61	10.51	17.36	27.87	32.13	35.45	67.58	77	67	144
P.E.=-.8												
REDUCE INTER-TOLL FOR ALL												
AND INTRA-TOLL FOR												
BELL AND B.C.TEL BY 10%	12.73	17.46	30.19	11.41	16.40	27.81	34.86	33.31	68.17	83	63	147
30%	15.13	14.43	29.56	13.55	14.48	28.03	41.40	29.02	70.42	99	56	155
50%	18.85	11.41	30.26	16.88	12.55	29.43	51.58	24.74	76.32	125	49	174
P.E.=-.8												
REDUCE INTER-TOLL BY 10%												
REDUCE INTRA-TOLL BY 10%	13.30	17.07	30.37	11.91	15.62	27.53	36.40	31.91	68.31	87	60	147
REDUCE INTER-TOLL BY 20%												
REDUCE INTRA-TOLL BY 15%	14.71	15.37	30.08	13.17	14.28	27.45	40.26	29.06	69.32	96	55	151
REDUCE INTER-TOLL BY 30%												
REDUCE INTRA-TOLL BY 15%	16.13	13.86	29.99	14.45	13.31	27.76	44.15	26.92	71.07	105	52	157
REDUCE INTER-TOLL BY 40%												
REDUCE INTRA-TOLL BY 20%	18.12	12.15	30.27	16.23	11.97	28.20	49.59	24.08	73.67	118	48	166
REDUCE INTER-TOLL BY 50%												
REDUCE INTRA-TOLL BY 20%	20.15	10.64	30.78	18.05	11.01	29.06	55.15	21.93	77.08	132	43	174
P.E.=-.8												
INCREASE INTER-AND INTRA-												
TOLL BY 10%	10.84	20.87	31.71	9.82	19.10	28.92	29.65	38.99	68.33	71	74	145
20%	9.99	22.76	32.75	8.94	20.83	29.77	27.33	42.54	69.87	65	81	146

NOTE 1. P.E. = PRICE ELASTICITY
NOTE 2. LOCAL RATE INCREASES FOR THESE SCENARIOS ARE AS DESCRIBED IN CHAPTER 3.

TABLE A.2
EFFECT OF LONG-DISTANCE (TOLL) RATE CHANGES ON AVERAGE MONTHLY SUBSCRIBER BILL - NOVA SCOTIA 1986
(IN DOLLARS)

SCENARIO	RESIDENTIAL URBAN			RESIDENTIAL RURAL			BUSINESS SINGLE LINE			BUSINESS PBX		
	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL
STATUS QUO	12.22	20.93	33.15	11.09	20.62	31.71	29.84	34.23	64.07	71	111	182
P.E.=.8 (NOTE 1)												
REDUCE INTER-TOLL BY 10%	12.93	19.53	32.46	11.73	19.87	31.60	31.57	33.00	64.57	75	106	181
30%	15.00	17.14	32.14	13.62	18.36	31.98	36.36	30.53	66.89	87	97	184
50%	18.04	14.74	32.78	16.37	16.86	33.23	44.04	28.07	72.11	105	87	192
REDUCE INTER-TOLL BY 30%												
P.E.=-1.3	13.65	17.14	30.79	12.38	18.36	30.74	33.33	30.53	63.86	79	97	186
P.E.=-.4	15.95	17.14	33.09	14.47	18.36	32.83	38.94	30.53	69.47	93	97	190
P.E.=-.8												
REDUCE INTRA-TOLL FOR												
BELL AND B.C.TEL BY 10%	12.09	20.93	33.02	10.97	10.62	21.59	29.51	34.23	63.74	70	111	181
30%	11.97	20.93	32.80	10.77	10.62	21.39	28.97	34.23	63.20	69	111	180
50%	11.68	20.93	32.55	10.54	10.62	21.16	28.37	34.23	62.60	67	111	178
REDUCE INTRA-TOLL FOR												
BELL AND B.C.TEL BY 30%												
P.E.=-1.3	12.02	20.93	32.95	10.91	10.62	21.53	29.36	34.23	63.59	70	111	181
P.E.=-.4	11.63	20.93	32.56	10.56	10.62	21.18	28.41	34.23	62.64	68	111	179
P.E.=-.8												
REDUCE INTER-TOLL FOR ALL												
AND INTRA-TOLL FOR												
BELL AND B.C.TEL BY 10%	12.83	19.53	32.36	11.64	19.87	31.51	31.33	33.00	64.33	75	106	181
30%	14.77	17.14	31.91	13.41	18.36	31.77	36.08	30.53	66.61	86	97	183
50%	17.82	14.74	32.56	16.17	16.86	33.03	43.51	28.07	71.58	104	87	191
P.E.=-.8												
REDUCE INTER-TOLL BY 10%												
REDUCE INTRA-TOLL BY 10%	13.70	18.66	32.36	12.43	18.56	30.99	33.45	30.81	64.26	80	100	180
REDUCE INTER-TOLL BY 20%												
REDUCE INTRA-TOLL BY 15%	15.07	17.02	32.09	13.67	17.15	30.82	36.79	28.48	65.27	88	92	180
REDUCE INTER-TOLL BY 30%												
REDUCE INTRA-TOLL BY 15%	16.22	15.82	32.04	14.72	16.40	31.12	39.60	27.95	67.55	94	87	181
REDUCE INTER-TOLL BY 40%												
REDUCE INTR- TOLL BY 20%	18.07	14.19	32.26	15.40	14.99	31.39	44.13	24.92	69.05	105	79	186
REDUCE INTER-TOLL BY 50%												
REDUCE INTRA-TOLL BY 20%	19.74	12.99	32.73	17.91	14.24	32.15	48.19	23.69	71.88	115	74	189
P.E.=-.8												
INCREASE INTER-AND INTRA-												
TOLL BY 10%	10.96	18.66	29.62	9.95	22.68	32.63	26.77	37.65	64.42	64	122	186
20%	10.01	20.73	30.74	9.08	24.74	33.82	24.44	41.08	65.52	58	133	191

NOTE 1. P.E. = PRICE ELASTICITY
NOTE 2. LOCAL RATE INCREASES FOR THESE SCENARIOS ARE AS DESCRIBED IN CHAPTER 3.

TABLE A.3
EFFECT OF LONG-DISTANCE (TOLL) RATE CHANGES ON AVERAGE MONTHLY SUBSCRIBER BILL - NEW BRUNSWICK 1985
(IN DOLLARS)

SCENARIO	RESIDENTIAL URBAN			RESIDENTIAL RURAL			BUSINESS SINGLE LINE			BUSINESS PBX		
	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL
STATUS QUO	10.93	21.88	32.81	13.48	17.14	30.62	34.99	61.74	96.73	228	608	836
P.E.=-.8 (NOTE 1)												
REDUCE INTER-TOLL BY 10%	11.66	20.56	32.22	14.38	16.34	30.72	37.33	58.48	95.81	243	572	815
30%	13.66	17.92	31.58	18.04	14.70	31.59	43.74	51.94	95.68	285	500	785
50%	16.61	15.28	31.89	20.49	13.06	33.55	53.18	45.42	98.60	347	427	774
REDUCE INTER-TOLL BY 30%												
P.E.=-1.3	12.39	17.92	30.31	15.29	14.70	29.99	39.68	51.94	91.62	259	500	759
P.E.=-.4	14.60	17.92	32.52	18.00	14.70	32.70	46.73	51.94	98.67	304	500	804
P.E.=-.8												
REDUCE INTRA-TOLL FOR												
BELL AND B.C.TEL BY 10%	10.82	21.88	32.70	13.35	17.14	30.49	34.64	61.74	96.38	227	608	835
30%	10.62	21.88	32.50	13.08	17.14	30.22	33.94	61.74	95.68	221	608	829
50%	10.36	21.88	32.24	12.78	17.14	29.22	33.17	61.74	94.91	216	608	824
REDUCE INTRA-TOLL FOR												
BELL AND B.C.TEL BY 30%												
P.E.=-1.3	10.37	21.88	32.25	12.79	17.14	29.93	33.21	61.74	94.95	216	608	824
P.E.=-.4	10.77	21.88	32.65	13.29	17.14	30.43	34.50	61.74	96.24	225	608	833
P.E.=-.8												
REDUCE INTER-TOLL FOR ALL												
AND INTRA-TOLL FOR												
BELL AND B.C.TEL BY 10%	11.57	20.56	32.13	14.27	16.34	30.61	37.04	58.48	95.52	241	572	813
30%	13.47	17.92	31.39	16.61	14.70	31.31	43.11	51.95	95.06	282	499	781
50%	16.40	15.28	31.68	20.25	13.06	33.31	52.55	45.42	97.97	342	427	769
P.E.=-.8												
REDUCE INTER-TOLL BY 10%												
REDUCE INTRA-TOLL BY 10%	12.24	19.69	31.93	14.83	15.44	30.27	39.19	55.57	94.76	255	547	802
REDUCE INTER-TOLL BY 20%												
REDUCE INTRA-TOLL BY 15%	13.51	17.93	31.44	16.66	14.18	30.84	43.25	50.85	94.10	282	499	781
REDUCE INTER-TOLL BY 30%												
REDUCE INTRA-TOLL BY 15%	14.65	16.62	31.27	18.04	13.36	31.40	46.82	47.58	94.47	305	464	769
REDUCE INTER-TOLL BY 40%												
REDUCE INTRA-TOLL BY 20%	16.35	14.87	31.22	20.17	12.09	32.26	52.35	42.86	95.21	341	414	755
REDUCE INTER-TOLL BY 50%												
REDUCE INTRA-TOLL BY 20%	17.96	13.55	31.51	22.15	11.27	33.42	57.49	39.60	97.09	375	378	753
P.E.=-.8												
INCREASE INTER-AND INTRA-												
TOLL BY 10%	9.88	24.07	33.95	12.19	18.88	31.07	31.63	67.91	99.54	206	669	875
20%	9.06	26.26	35.32	11.17	20.59	31.76	29.01	74.09	103.10	189	730	919

NOTE 1. P.E. = PRICE ELASTICITY
NOTE 2. LOCAL RATE INCREASES FOR THESE SCENARIOS ARE AS DESCRIBED IN CHAPTER 3.

TABLE A.4
EFFECT OF LONG-DISTANCE (TOLL) RATE CHANGES ON AVERAGE MONTHLY SUBSCRIBER BILL - ONT./QUE. (BELL CANADA) 1985
(IN DOLLARS)

SCENARIO	RESIDENTIAL URBAN			RESIDENTIAL RURAL			BUSINESS SINGLE LINE			BUSINESS PBX		
	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL
STATUS QUO	9.61	19.26	28.87	5.98	21.50	27.48	54.00	94.94	148.94	733	4223	4956
P.E.=-.8 (NOTE 1)												
REDUCE INTER-TOLL BY 10%	9.93	18.49	28.42	6.18	20.65	26.83	55.82	90.27	146.09	758	4110	4868
30%	10.89	16.96	27.85	6.78	18.95	25.73	61.18	82.92	144.10	830	3883	4713
50%	12.36	15.43	27.79	7.69	17.25	24.94	69.47	75.57	145.04	943	3656	4599
REDUCE INTER-TOLL BY 30%												
P.E.=-1.3	10.09	16.96	27.06	6.28	18.95	25.23	56.69	82.92	139.61	770	3883	4653
P.E.=-.4	11.44	16.96	28.40	7.12	18.95	26.07	64.26	82.92	147.18	872	3883	4755
P.E.=-.8												
REDUCE INTRA-TOLL FOR												
BELL AND B.C.TEL BY 10%	10.32	18.10	28.42	6.42	20.20	26.26	58.02	88.20	146.24	788	3914	4702
30%	12.25	15.78	28.03	7.62	17.60	25.22	68.85	76.78	145.63	935	3297	4232
50%	15.01	13.46	28.47	9.34	15.00	24.34	84.32	65.35	149.67	1145	2679	3824
REDUCE INTRA-TOLL FOR												
BELL AND B.C.TEL BY 30%												
P.E.=-1.3	11.53	15.78	27.31	7.17	17.60	24.77	64.75	76.78	141.53	879	3297	4176
P.E.=-.4	13.09	15.78	28.87	7.93	17.60	25.53	71.60	76.78	148.38	972	3297	4269
P.E.=-.8												
REDUCE INTER-TOLL FOR ALL												
AND INTRA-TOLL FOR												
BELL AND B.C.TEL BY 10%	10.65	17.33	27.98	6.62	19.35	25.97	59.82	84.55	144.37	812	3801	4613
30%	13.50	13.48	26.98	8.40	15.05	23.45	75.77	65.76	141.53	1028	2956	3984
50%	17.66	9.63	27.29	10.99	10.75	21.74	99.21	46.97	146.18	1347	2112	3459
P.E.=-.8												
REDUCE INTER-TOLL BY 10%												
REDUCE INTRA-TOLL BY 10%	10.62	17.33	27.95	6.61	19.35	25.96	59.66	84.55	144.21	810	3801	4611
REDUCE INTER-TOLL BY 20%												
REDUCE INTRA-TOLL BY 15%	11.44	15.99	27.43	7.12	17.85	24.97	64.26	78.01	142.27	872	3611	4483
REDUCE INTER-TOLL BY 30%												
REDUCE INTRA-TOLL BY 15%	11.97	15.22	27.19	7.45	17.00	24.45	67.28	74.34	141.62	913	3419	4332
REDUCE INTER-TOLL BY 40%												
REDUCE INTRA-TOLL BY 20%	13.08	13.88	26.96	8.14	15.50	23.64	73.49	67.80	141.29	998	3151	4149
REDUCE INTER-TOLL BY 50%												
REDUCE INTRA-TOLL BY 20%	13.89	13.11	27.00	8.64	14.65	23.29	78.04	64.13	142.17	1059	3038	4097
P.E.=-.8												
INCREASE INTER-AND INTRA-												
TOLL BY 10%	8.82	21.19	30.01	5.49	23.65	29.14	49.59	103.33	152.92	673	4645	5318
20%	8.23	23.11	31.34	5.12	25.80	30.92	46.27	112.73	159.00	628	5068	5696

NOTE 1. P.E. = PRICE ELASTICITY
NOTE 2. LOCAL RATE INCREASES FOR THESE SCENARIOS ARE AS DESCRIBED IN CHAPTER 3.

TABLE A.5
EFFECT OF LONG-DISTANCE (TOLL) RATE CHANGES ON AVERAGE MONTHLY SUBSCRIBER BILL - ALBERTA (AGT) 1985
(IN DOLLARS)

SCENARIO	RESIDENTIAL URBAN			RESIDENTIAL RURAL			BUSINESS SINGLE LINE			BUSINESS PBX		
	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL
STATUS QUO	9.94	29.28	39.22	11.09	31.70	42.79	23.79	42.76	66.55	113	600	713
P.E.=-.8 (NOTE 1)												
REDUCE INTER-TOLL BY 10%	10.76	27.58	38.33	12.00	30.85	42.85	25.74	41.19	66.93	122	571	693
30%	13.07	24.18	37.25	14.58	29.14	43.72	31.28	38.04	69.32	149	512	661
50%	16.50	20.79	37.29	18.41	27.42	45.83	39.49	34.90	74.39	188	453	641
REDUCE INTER-TOLL BY 30%												
P.E.=-1.3	11.33	24.18	35.51	12.64	29.14	41.78	27.12	38.04	65.16	129	512	641
P.E.=-.4	14.21	24.18	38.39	15.86	29.14	45.00	34.02	38.04	72.06	162	512	674
P.E.=-.8												
REDUCE INTRA-TOLL FOR												
BELL AND B.C.TEL BY 10%	9.74	29.28	39.02	10.87	31.70	42.57	23.31	42.76	66.07	111	600	711
30%	9.51	29.28	38.82	10.65	31.70	42.35	22.84	42.76	65.60	108	600	708
50%	9.24	29.28	38.52	10.31	31.70	42.01	22.12	42.76	64.88	105	600	705
REDUCE INTRA-TOLL FOR												
BELL AND B.C.TEL BY 30%												
P.E.=-1.3	9.24	29.28	38.62	10.31	31.70	42.01	22.12	42.76	64.88	105	600	705
P.E.=-.4	9.74	29.28	39.02	10.87	31.70	42.57	23.31	42.76	66.07	111	600	711
P.E.=-.8												
REDUCE INTER-TOLL FOR ALL												
AND INTRA-TOLL FOR												
BELL AND B.C.TEL BY 10%	10.63	27.58	38.22	11.87	30.85	42.72	25.45	41.19	66.65	121	571	692
30%	12.92	24.18	37.10	14.42	29.14	43.56	30.93	38.04	68.97	147	512	659
50%	15.90	20.79	36.69	17.74	27.42	45.16	38.06	34.90	72.96	181	453	634
P.E.=-.8												
REDUCE INTER-TOLL BY 10%												
REDUCE INTRA-TOLL BY 10%	11.93	26.36	38.29	13.31	28.53	41.84	28.55	38.48	67.03	136	540	676
REDUCE INTER-TOLL BY 20%												
REDUCE INTRA-TOLL BY 15%	13.72	24.04	37.76	15.30	26.52	41.82	32.83	35.56	68.39	156	495	651
REDUCE INTER-TOLL BY 30%												
REDUCE INTRA-TOLL BY 15%	14.91	22.34	37.25	16.64	25.67	42.31	35.69	33.99	69.68	170	466	656
REDUCE INTER-TOLL BY 40%												
REDUCE INTRA-TOLL BY 20%	17.30	20.02	37.32	19.30	23.65	42.95	41.39	31.06	72.45	197	421	618
REDUCE INTER-TOLL BY 50%												
REDUCE INTRA-TOLL BY 20%	19.08	18.33	37.41	21.29	22.80	44.09	45.68	29.49	75.17	217	392	609
P.E.=-.8												
INCREASE INTER-AND INTRA-												
TOLL BY 10%	8.25	32.11	40.36	9.20	34.87	44.07	19.75	47.04	66.79	94	660	754
20%	7.06	35.14	42.20	7.87	38.04	45.91	16.89	51.31	68.20	80	720	800

NOTE 1. P.E. = PRICE ELASTICITY
NOTE 2. LOCAL RATE INCREASES FOR THESE SCENARIOS ARE AS DESCRIBED IN CHAPTER 3.

TABLE A.6
EFFECT OF LONG-DISTANCE (TOLL) RATE CHANGES ON AVERAGE MONTHLY RESIDENTIAL SUBSCRIBER BILL (1985*)
(IN DOLLARS)

SCENARIO	NEWFOUNDLAND			MANITOBA			SASKATCHEWAN			BRITISH COLUMBIA		
	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL	LOCAL	TOLL	TOTAL
STATUS QUO	14.09	22.85	36.94	8.36	13.88	22.24	7.22	28.05	35.27	11.15	22.74	33.89
P.E.=-.8 (NOTE 1)												
REDUCE INTER-TOLL BY 10%	15.49	21.57	37.06	9.00	12.98	21.98	7.96	27.72	35.68	11.90	21.62	33.52
30%	19.40	19.02	38.42	10.74	11.17	21.91	10.04	25.05	35.09	14.00	19.39	33.39
50%	24.89	16.46	41.35	13.27	9.37	22.64	13.12	22.38	35.50	17.15	17.16	34.31
REDUCE INTER-TOLL BY 30%												
P.E.=-1.3	17.13	19.02	36.15	9.50	11.17	20.67	8.55	25.05	33.60	12.28	19.39	31.67
P.E.=-.4	21.01	19.02	40.03	11.60	11.17	22.77	11.07	25.05	36.12	15.11	19.39	34.50
P.E.=-.8												
REDUCE INTRA-TOLL FOR												
BELL AND B.C.TEL BY 10%	13.91	22.85	36.76	8.26	13.88	22.14	7.15	28.05	35.20	12.28	21.58	33.86
30%	13.39	22.85	36.24	8.03	13.88	21.91	6.98	28.05	35.03	15.23	19.27	34.50
50%	12.89	22.85	35.74	7.77	13.88	21.65	6.80	28.05	34.85	19.38	16.96	36.34
REDUCE INTRA-TOLL FOR												
BELL AND B.C.TEL BY 30%												
P.E.=-1.3	12.93	22.85	35.78	7.78	13.88	21.66	6.81	28.05	34.86	14.56	19.27	33.83
P.E.=-.4	13.72	22.85	36.57	8.20	13.88	22.08	7.11	28.05	35.16	15.69	19.27	34.96
P.E.=-.8												
REDUCE INTER-TOLL FORALL												
AND INTRA-TOLL FOR												
BELL AND B.C.TEL BY 10%	15.31	21.57	36.88	8.90	12.98	21.88	7.89	27.72	35.61	13.01	20.47	33.48
30%	18.97	19.02	37.99	10.48	11.17	21.65	9.87	25.05	34.92	17.98	15.92	33.90
50%	24.47	16.46	40.93	12.98	9.37	22.35	12.96	22.38	35.34	25.11	11.37	36.48
P.E.=-.8												
REDUCE INTER-TOLL BY 10%												
REDUCE INTRA-TOLL BY 10%	16.84	20.57	37.41	9.41	12.49	21.90	8.84	25.25	34.09	12.93	20.47	33.40
REDUCE INTER-TOLL BY 20%												
REDUCE INTRA-TOLL BY 15%	19.37	18.78	38.15	10.44	11.35	21.79	10.27	24.03	34.30	14.47	18.77	33.24
REDUCE INTER-TOLL BY 30%												
REDUCE INTRA-TOLL BY 15%	21.52	17.51	39.03	11.40	10.44	21.84	11.42	22.69	34.11	15.63	17.66	33.30
REDUCE INTER-TOLL BY 40%												
REDUCE INTRA-TOLL BY 20%	24.87	15.72	40.59	12.83	9.30	22.13	13.37	20.57	33.94	17.73	15.65	33.38
REDUCE INTER-TOLL BY 50%												
REDUCE INTRA-TOLL BY 20%	27.83	14.45	42.28	14.22	8.40	22.62	15.05	19.24	34.29	19.47	14.84	34.31
P.E.=-.8												
INCREASE INTER-AND INTRA-												
TOLL BY 10%	11.72	25.14	36.86	7.54	15.27	22.81	5.95	30.86	36.81	9.79	25.01	34.80
20%	9.86	27.42	37.28	6.90	16.66	23.56	4.96	33.66	38.62	8.73	27.29	36.02

NOTE 1. P.E. = PRICE ELASTICITY
NOTE 2. LOCAL RATE INCREASES FOR THESE SCENARIOS ARE AS DESCRIBED IN CHAPTER 3.
* FOR NFLD. TEL. AND B.C. TEL., BILL ESTIMATES ARE FOR 1986.

CHAPTER 9

APPENDIX B

Effects of Long-Distance Rate Changes on Residential Subscriber Bills

(Assumed price elasticity = -.8)

Newfoundland (1986)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	0%
	Local Services	9.9%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	343	0.3
-5	0	30,184	26.4
0	5	49,734	43.5
5	10	33,934	29.7
10	20	0	0.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	0	0.0
-50	-30	11	0.0
-30	-20	114	0.1
-20	-15	217	0.2
-15	-10	686	0.6
-10	-5	1,029	0.9
-5	-1	11,662	10.2
-1	0	16,807	14.7
0	1	49,734	43.5
1	5	33,934	29.7
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Newfoundland (1986)

Rate Changes:		
	Inter-Company	-30%
	Intra-Company	0%
	Local Services	37.7%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	3,887	3.4
-10	-5	9,833	8.6
-5	0	3,430	3.0
0	5	23,324	20.4
5	10	19,894	17.4
10	20	19,894	17.4
20	30	15,275	13.4
30	40	18,659	16.3
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	34	0.0
-75	-50	194	0.2
-50	-30	343	0.3
-30	-20	1,486	1.3
-20	-15	0	0.0
-15	-10	1,829	1.6
-10	-5	6,974	6.1
-5	-1	6,288	5.5
-1	0	0	0.0
0	1	13,377	11.7
1	5	,337	61.5
5	10	,331	11.7
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Newfoundland (1986)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	0%
	Local Services	76.7%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	1,029	0.9
-20	-10	7,432	6.5
-10	-5	5,259	4.6
-5	0	3,430	3.0
0	5	3,430	3.0
5	10	9,947	8.7
10	20	29,841	26.1
20	30	9,947	8.7
30	40	9,947	8.7
40	50	9,947	8.7
50	60	5,328	4.7
60	70	10,656	9.3
70	80	8,003	7.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	126	0.1
-100	-75	217	0.2
-75	-50	229	0.2
-50	-30	1,486	1.3
-30	-20	0	0.0
-20	-15	1,829	1.6
-15	-10	2,287	2.0
-10	-5	4,688	4.1
-5	-1	2,858	2.5
-1	0	3,430	3.0
0	1	0	0.0
1	5	23,324	20.4
5	10	55,062	48.2
10	15	18,659	16.3
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Newfoundland (1985)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	-10%
	Local Services	19.5%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	8,461	7.4
-5	0	12,119	10.6
0	5	39,788	34.8
5	10	19,894	17.4
10	20	33,934	29.7
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	11	0.0
-50	-30	217	0.2
-30	-20	343	0.3
-20	-15	457	0.4
-15	-10	1,029	0.9
-10	-5	4,116	3.6
-5	-1	10,976	9.6
-1	0	3,430	3.0
0	1	29,841	26.1
1	5	63,774	55.8
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Newfoundland (1986)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	-20%
	Local Services	97.5%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	572	0.5
-30	-20	3,316	2.9
-20	-10	6,974	6.1
-10	-5	2,858	2.5
-5	0	3,430	3.0
0	5	0	0.0
5	10	3,430	3.0
10	20	29,841	26.1
20	30	9,947	8.7
30	40	9,947	8.7
40	50	9,947	8.7
50	60	9,947	8.7
60	70	0	0.0
70	80	10,656	9.3
80	90	5,328	4.7
90	100	8,003	7.0

$ Change in Bill		Number	Per Cent
-1000	-100	229	0.2
-100	-75	343	0.3
-75	-50	457	0.4
-50	-30	1,029	0.9
-30	-20	1,829	1.6
-20	-15	2,287	2.0
-15	-10	2,287	2.0
-10	-5	2,401	2.1
-5	-1	6,288	5.5
-1	0	0	0.0
0	1	0	0.0
1	5	23,324	20.4
5	10	29,841	26.1
10	15	43,881	38.4
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

P.E.I. (1986)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	0%
	Local Services	7.4%

% Change In Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	1,381	3.3
-5	0	16,379	39.1
0	5	15,735	37.5
5	10	8,387	20.0
10	20	0	0.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	0	0.0
-50	-30	25	0.1
-30	-20	101	0.2
-20	-15	63	0.2
-15	-10	105	0.3
-10	-5	294	0.7
-5	-1	8,447	20.1
-1	0	8,726	20.8
0	1	24,122	57.5
1	5	0	0.0
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

P.E.I. (1986)

Rate Changes:		
	Inter-Company	-30%
	Intra-Company	0%
	Local Services	28.8%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	2	0.0
-20	-10	4,842	11.5
-10	-5	5,586	13.3
-5	0	4,894	11.7
0	5	4,533	10.8
5	10	4,194	10.0
10	20	9,445	22.5
20	30	8,387	20.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	13	0.0
-100	-75	29	0.1
-75	-50	84	0.2
-50	-30	168	0.4
-30	-20	126	0.3
-20	-15	168	0.4
-15	-10	1,132	2.7
-10	-5	3,125	7.5
-5	-1	6,98[illegible]	16.7
-1	0	3,49[illegible]	8.3
0	1	4,533	10.8
1	5	22,026	52.5
5	10	[illegible]	0.0
10	15	[illegible]	0.0
15	20	[illegible]	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

P.E.I. (1986)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	0%
	Local Services	59.8%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	241	0.6
-30	-20	1,999	4.8
-20	-10	4,705	11.2
-10	-5	3,485	8.3
-5	0	2,089	5.0
0	5	2,805	6.7
5	10	2,436	5.8
10	20	5,251	12.5
20	30	4,194	10.0
30	40	6,291	15.0
40	50	4,194	10.0
50	60	4,194	10.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	75	0.2
-100	-75	113	0.3
-75	-50	105	0.3
-50	-30	126	0.3
-30	-20	629	1.5
-20	-15	671	1.6
-15	-10	2,432	5.8
-10	-5	2,089	5.0
-5	-1	4,190	10.0
-1	0	2,089	5.0
0	1	2,101	5.0
1	5	13,625	32.5
5	10	13,638	32.5
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

P.E.I. (1986)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	-10%
	Local Services	11.2%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	5,548	13.2
-5	0	12,212	29.1
0	5	9,445	22.5
5	10	12,581	30.0
10	20	2,097	5.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	4	0.0
-50	-30	71	0.2
-30	-20	113	0.3
-20	-15	105	0.3
-15	-10	126	0.3
-10	-5	1,300	3.1
-5	-1	8,711	20.8
-1	0	7,330	17.5
0	1	13,621	32.5
1	5	10,502	25.0
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

P.E.I. (1986)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	-20%
	Local Services	68.5%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	503	1.2
-30	-20	2,952	7.0
-20	-10	4,183	10.0
-10	-5	2,793	6.7
-5	0	2,793	6.7
0	5	1,397	3.3
5	10	3,140	7.5
10	20	4,194	10.0
20	30	4,194	10.0
30	40	3,154	7.5
40	50	4,194	10.0
50	60	5,233	12.5
60	70	3,154	7.5
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0
$ Change in Bill		**Number**	**Per Cent**
-1000	-100	126	0.3
-100	-75	63	0.2
-75	-50	231	0.6
-50	-30	168	0.4
-30	-20	1,132	2.7
-20	-15	1,048	2.5
-15	-10	1,384	3.3
-10	-5	2,793	6.7
-5	-1	4,190	10.0
-1	0	2,089	5.0
0	1	1,397	3.3
1	5	10,471	25.0
5	10	16,792	40.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Nova Scotia (1986)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	0%
	Local Services	5.8%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	0	0.0
-5	0	130,763	43.3
0	5	140,850	46.6
5	10	30,199	10.0
10	20	0	0.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	0	0.0
-50	-30	0	0.0
-30	-20	181	0.1
-20	-15	332	0.1
-15	-10	1,450	0.5
-10	-5	3,171	1.1
-5	-1	45,178	15.0
-1	0	80,451	26.6
0	1	171,049	56.6
1	5	0	0.0
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Nova Scotia (1986)

Rate Changes:		
	Inter-Company	-30%
	Intra-Company	0%
	Local Services	22.8%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	9,967	3.3
-10	-5	44,370	14.7
-5	0	50,282	16.7
0	5	46,257	15.3
5	10	40,226	13.3
10	20	80,512	26.7
20	30	30,199	10.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	30	0.0
-75	-50	272	0.1
-50	-30	1,661	0.6
-30	-20	1,359	0.5
-20	-15	1,812	0.6
-15	-10	2,416	0.8
-10	-5	22,650	7.5
-5	-1	50,282	16.7
-1	0	24,138	8.0
0	1	40,226	13.3
1	5	156,968	52.0
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Nova Scotia (1986)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	0%
	Local Services	47.6%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	4,047	1.3
-20	-10	30,177	10.0
-10	-5	26,144	8.7
-5	0	24,138	8.0
0	5	30,169	10.0
5	10	20,113	6.7
10	20	46,257	15.3
20	30	36,213	12.0
30	40	39,255	13.0
40	50	45,299	15.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	181	0.1
-100	-75	332	0.1
-75	-50	1,450	0.5
-50	-30	3,171	1.1
-30	-20	0	0.0
-20	-15	2,416	0.8
-15	-10	13,590	4.5
-10	-5	19,116	6.3
-5	-1	34,194	11.3
-1	0	10,056	3.3
0	1	20,113	6.7
1	5	133,783	44.3
5	10	63,411	21.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Nova Scotia (1986)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	-10%
	Local Services	12.1%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	44,281	14.7
-5	0	80,451	26.6
0	5	70,395	23.3
5	10	61,387	20.3
10	20	45,299	15.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	30	0.0
-50	-30	483	0.2
-30	-20	1,450	0.5
-20	-15	1,359	0.5
-15	-10	1,812	0.6
-10	-5	16,006	5.3
-5	-1	59,342	19.7
-1	0	44,251	14.7
0	1	86,495	28.6
1	5	90,586	30.0
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Nova Scotia (1986)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	-20%
	Local Services	61.5%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	1,963	0.7
-30	-20	19,177	6.3
-20	-10	33,198	11.0
-10	-5	20,113	6.7
-5	0	20,113	6.7
0	5	20,113	6.7
5	10	16,088	5.3
10	20	34,194	11.3
20	30	30,169	10.0
30	40	31,187	10.3
40	50	30,199	10.0
50	60	30,199	10.0
60	70	15,100	5.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	513	0.2
-100	-75	1,450	0.5
-75	-50	1,359	0.5
-50	-30	1,812	0.6
-30	-20	8,456	2.8
-20	-15	7,550	2.5
-15	-10	9,060	3.0
-10	-5	20,113	6.7
-5	-1	34,194	11.3
-1	0	10,056	3.3
0	1	10,056	3.3
1	5	84,476	28.0
5	10	112,717	37.3
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

New Brunswick (1985)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	0%
	Local Services	6.7%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	1,540	0.7
-5	0	85,933	37.4
0	5	119,596	52.0
5	10	22,809	9.9
10	20	0	0.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	0	0.0
-50	-30	0	0.0
-30	-20	230	0.1
-20	-15	322	0.1
-15	-10	368	0.2
-10	-5	6,299	2.7
-5	-1	48,012	20.9
-1	0	32,243	14.0
0	1	142,405	61.9
1	5	0	0.0
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

New Brunswick (1985)

Rate Changes:		
	Inter-Company	-30%
	Intra-Company	0%
	Local Services	25%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	21,122	9.2
-10	-5	34,109	14.8
-5	0	22,928	10.0
0	5	37,079	16.1
5	10	47,409	20.6
10	20	51,140	22.2
20	30	16,091	7.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	69	0.0
-75	-50	276	0.1
-50	-30	575	0.2
-30	-20	920	0.4
-20	-15	4,138	1.8
-15	-10	5,517	2.4
-10	-5	23,048	10.0
-5	-1	29,138	12.7
-1	0	14,479	6.3
0	1	37,079	16.1
1	5	114,641	49.9
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

New Brunswick (1985)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	0%
	Local Services	52%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	8,461	3.7
-20	-10	32,977	14.3
-10	-5	13,793	6.0
-5	0	19,196	8.4
0	5	3,732	1.6
5	10	24,660	10.7
10	20	37,587	16.4
20	30	29,705	12.9
30	40	36,960	16.1
40	50	6,717	2.9
50	60	16,091	7.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	230	0.1
-100	-75	115	0.0
-75	-50	575	0.2
-50	-30	3,714	1.6
-30	-20	4,424	1.9
-20	-15	2,436	1.1
-15	-10	11,494	5.0
-10	-5	18,450	8.0
-5	-1	22,241	9.7
-1	0	10,748	4.7
0	1	0	0.0
1	5	103,744	45.1
5	10	51,708	22.5
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

New Brunswick (1985)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	-10%
	Local Services	12%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	39,199	17.1
-5	0	48,274	21.0
0	5	75,173	32.7
5	10	51,140	22.2
10	20	16,091	7.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	23	0.0
-50	-30	322	0.1
-30	-20	575	0.2
-20	-15	920	0.4
-15	-10	4,138	1.8
-10	-5	11,264	4.9
-5	-1	46,438	20.2
-1	0	23,794	10.4
0	1	90,697	39.5
1	5	51,708	22.5
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

New Brunswick (1985)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	-20%
	Local Services	64.3%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	1,839	0.8
-30	-20	19,283	8.4
-20	-10	31,869	13.9
-10	-5	10,688	4.6
-5	0	10,748	4.7
0	5	3,732	1.6
5	10	9,315	4.1
10	20	32,989	14.4
20	30	42,184	18.4
30	40	22,988	10.0
40	50	21,435	9.3
50	60	6,717	2.9
60	70	16,091	7.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	345	0.1
-100	-75	575	0.2
-75	-50	920	0.4
-50	-30	5,380	2.3
-30	-20	4,275	1.9
-20	-15	9,628	4.2
-15	-10	8,762	3.8
-10	-5	18,450	8.0
-5	-1	15,345	6.7
-1	0	10,748	4.7
0	1	0	0.0
1	5	81,502	35.5
5	10	73,949	32.2
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Ontario/Quebec (Bell) (1985)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	0%
	Local Services	3.3%

% Change in Bill		Subscribers Affected	
From	To	Number (In thousands)	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	545	10.3
-5	0	3,471	65.4
0	5	1,292	24.3
5	10	0	0.0
10	20	0	0.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number (In thousands)	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	0	0.0
-50	-30	1	0.0
-30	-20	9	0.2
-20	-15	14	0.3
-15	-10	32	0.6
-10	-5	100	1.9
-5	-1	1,198	22.6
-1	0	2,663	50.2
0	1	1,292	24.3
1	5	0	0.0
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Ontario/Quebec (Bell) (1985)

Rate Changes:		
	Inter-Company	-30%
	Intra-Company	0%
	Local Services	13.3%

% Change in Bill		Subscribers Affected	
From	To	Number (In thousands)	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	1,314	24.7
-10	-5	1,172	22.1
-5	0	1,149	21.7
0	5	822	15.5
5	10	480	9.0
10	20	372	7.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number (In thousands)	Per Cent
-1000	-100	0	0.0
-100	-75	5	0.1
-75	-50	10	0.2
-50	-30	41	0.8
-30	-20	24	0.5
-20	-15	48	0.9
-15	-10	271	5.1
-10	-5	519	9.8
-5	-1	1,540	29.0
-1	0	1,177	22.2
0	1	1,172	22.1
1	5	501	9.4
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Ontario/Quebec (Bell) (1985)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	0%
	Local Services	28.6%

% Change in Bill		Subscribers Affected	
From	To	Number (In thousands)	Per Cent
-50	-40	0	0.0
-40	-30	53	1.0
-30	-20	793	14.9
-20	-10	1,010	19.0
-10	-5	670	12.6
-5	0	709	13.4
0	5	523	9.9
5	10	469	8.8
10	20	694	13.1
20	30	386	7.3
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number (In thousands)	Per Cent
-1000	-100	10	0.2
-100	-75	14	0.3
-75	-50	32	0.6
-50	-30	40	0.7
-30	-20	172	3.2
-20	-15	133	2.5
-15	-10	306	5.8
-10	-5	526	9.9
-5	-1	1,281	24.1
-1	0	721	13.6
0	1	659	12.4
1	5	1,414	26.6
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Ontario/Quebec (Bell) (1985)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	-10%
	Local Services	10.5%

% Change in Bill		Subscribers Affected	
From	To	Number (In thousands)	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	1,023	19.3
-5	0	1,769	33.3
0	5	1,588	29.9
5	10	557	10.5
10	20	372	7.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number (In thousands)	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	0	0.0
-50	-30	10	0.2
-30	-20	14	0.3
-20	-15	27	0.5
-15	-10	29	0.5
-10	-5	261	4.9
-5	-1	1,038	19.5
-1	0	1,414	26.6
0	1	2,266	42.7
1	5	250	4.7
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Ontario/Quebec (Bell) (1985)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	-20%
	Local Services	44.5%

% Change in Bill		Subscribers Affected	
From	To	Number (In thousands)	Per Cent
-50	-40	0	0.0
-40	-30	258	4.9
-30	-20	725	13.7
-20	-10	701	13.2
-10	-5	456	8.6
-5	0	552	10.4
0	5	422	7.9
5	10	466	8.8
10	20	672	12.7
20	30	493	9.3
30	40	192	3.6
40	50	372	7.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number (In thousands)	Per Cent
-1000	-100	15	0.3
-100	-75	19	0.4
-75	-50	34	0.6
-50	-30	44	0.8
-30	-20	212	4.0
-20	-15	190	3.6
-15	-10	270	5.1
-10	-5	434	8.2
-5	-1	953	17.9
-1	0	521	9.8
0	1	549	10.3
1	5	2,003	37.7
5	10	65	1.2
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Manitoba (1985)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	0%
	Local Services	7.6%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	19,737	5.4
-5	0	137,644	37.5
0	5	147,109	40.1
5	10	62,365	17.0
10	20	0	0.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	0	0.0
-50	-30	110	0.0
-30	-20	440	0.1
-20	-15	770	0.2
-15	-10	844	0.2
-10	-5	9,135	2.5
-5	-1	29,715	8.1
-1	0	116,366	31.7
0	1	209,474	57.1
1	5	0	0.0
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Manitoba (1985)

Rate Changes:		
	Inter-Company	-30%
	Intra-Company	0%
	Local Services	28.4%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	41,014	11.2
-10	-5	26,487	7.2
-5	0	43,289	11.8
0	5	73,738	20.1
5	10	31,916	8.7
10	20	88,045	24.0
20	30	62,365	17.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	37	0.0
-100	-75	330	0.1
-75	-50	477	0.1
-50	-30	1,321	0.4
-30	-20	2,018	0.6
-20	-15	7,117	1.9
-15	-10	13,207	3.6
-10	-5	10,639	2.9
-5	-1	44,096	12.0
-1	0	31,550	8.6
0	1	73,738	20.1
1	5	182,327	49.7
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Manitoba (1985)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	0%
	Local Services	58.7%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	844	0.2
-30	-20	28,798	7.9
-20	-10	11,373	3.1
-10	-5	26,487	7.2
-5	0	25,680	7.0
0	5	39,253	10.7
5	10	24,946	6.8
10	20	27,147	7.4
20	30	72,270	19.7
30	40	0	0.0
40	50	84,377	23.0
50	60	25,680	7.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	550	0.2
-100	-75	770	0.2
-75	-50	844	0.2
-50	-30	2,018	0.6
-30	-20	11,152	3.0
-20	-15	9,171	2.5
-15	-10	5,136	1.4
-10	-5	11,373	3.1
-5	-1	26,487	7.2
-1	0	25,680	7.0
0	1	17,609	4.8
1	5	256,065	69.8
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Manitoba (1985)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	-10%
	Local Services	12.6%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	41,014	11.2
-5	0	91,420	24.9
0	5	84,010	22.9
5	10	88,045	24.0
10	20	62,365	17.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	37	0.0
-50	-30	514	0.1
-30	-20	770	0.2
-20	-15	844	0.2
-15	-10	2,018	0.6
-10	-5	20,324	5.5
-5	-1	32,357	8.8
-1	0	75,572	20.6
0	1	208,741	56.9
1	5	25,680	7.0
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Manitoba (1985)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	-20%
	Local Services	70.1%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	11,299	3.1
-30	-20	23,846	6.5
-20	-10	12,180	3.3
-10	-5	20,177	5.5
-5	0	25,680	7.0
0	5	17,609	4.8
5	10	21,644	5.9
10	20	52,093	14.2
20	30	31,916	8.7
30	40	40,354	11.0
40	50	47,691	13.0
50	60	36,686	10.0
60	70	25,680	7.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	844	0.2
-100	-75	477	0.1
-75	-50	2,861	0.8
-50	-30	7,117	1.9
-30	-20	8,438	2.3
-20	-15	9,905	2.7
-15	-10	5,503	1.5
-10	-5	5,870	1.6
-5	-1	38,226	10.4
-1	0	13,940	3.8
0	1	17,609	4.8
1	5	146,008	39.8
5	10	110,057	30.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Saskatchewan (1985)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	0%
	Local Services	10.2%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	0	0.0
-5	0	181,525	50.2
0	5	115,776	32.0
5	10	38,875	10.8
10	20	25,306	7.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	0	0.0
-50	-30	0	0.0
-30	-20	108	0.0
-20	-15	289	0.1
-15	-10	2,820	0.8
-10	-5	6,146	1.7
-5	-1	77,377	21.4
-1	0	94,785	26.2
0	1	179,958	49.8
1	5	0	0.0
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Saskatchewan (1985)

Rate Changes:		
	Inter-Company	-30%
	Intra-Company	0%
	Local Services	36.9%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	14,531	4.0
-10	-5	87,632	24.2
-5	0	53,045	14.7
0	5	49,861	13.8
5	10	47,622	13.2
10	20	44,611	12.3
20	30	38,875	10.8
30	40	25,306	7.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	296	0.1
-50	-30	1,909	0.5
-30	-20	3,543	1.0
-20	-15	3,615	1.0
-15	-10	8,003	2.2
-10	-5	29,954	8.3
-5	-1	76,437	21.1
-1	0	31,450	8.7
0	1	58,447	16.2
1	5	147,828	40.9
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Saskatchewan (1985)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	0%
	Local Services	81.8%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	742	0.2
-20	-10	57,709	16.0
-10	-5	43,713	12.1
-5	0	26,364	7.3
0	5	26,680	7.4
5	10	26,317	7.3
10	20	41,041	11.4
20	30	39,983	11.1
30	40	34,753	9.6
40	50	13,569	3.8
50	60	11,130	3.1
60	70	14,176	3.9
70	80	0	0.0
80	90	25,306	7.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	108	0.0
-100	-75	289	0.1
-75	-50	1,807	0.5
-50	-30	3,543	1.0
-30	-20	3,615	1.0
-20	-15	8,003	2.2
-15	-10	10,435	2.9
-10	-5	38,244	10.6
-5	-1	44,422	12.3
-1	0	18,061	5.0
0	1	21,617	6.0
1	5	145,317	40.2
5	10	66,021	18.3
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Saskatchewan (1985)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	-10%
	Local Services	22.4%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	86,764	24.0
-5	0	94,762	26.2
0	5	71,166	19.7
5	10	44,611	12.3
10	20	38,875	10.8
20	30	25,306	7.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	36	0.0
-50	-30	651	0.2
-30	-20	2,531	0.7
-20	-15	2,531	0.7
-15	-10	3,615	1.0
-10	-5	24,400	6.7
-5	-1	100,322	27.8
-1	0	47,439	13.1
0	1	91,677	25.4
1	5	88,281	24.4
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Saskatchewan (1985)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	-20%
	Local Services	108.5%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	1,638	0.5
-30	-20	38,088	10.5
-20	-10	62,437	17.3
-10	-5	21,594	6.0
-5	0	20,504	5.7
0	5	17,306	4.8
5	10	19,957	5.5
10	20	41,041	11.4
20	30	19,189	5.3
30	40	32,338	8.9
40	50	12,556	3.5
50	60	10,653	2.9
60	70	13,569	3.8
70	80	11,130	3.1
80	90	14,176	3.9
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	687	0.2
-100	-75	1,518	0.4
-75	-50	3,543	1.0
-50	-30	3,615	1.0
-30	-20	14,691	4.1
-20	-15	9,709	2.7
-15	-10	26,557	7.3
-10	-5	33,733	9.3
-5	-1	34,473	9.5
-1	0	15,734	4.4
0	1	12,243	3.4
1	5	95,635	26.5
5	10	109,343	30.2
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Alberta (AGT) (1985)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	0%
	Local Services	8.2%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	12	0.0
-5	0	270,319	42.8
0	5	203,073	32.1
5	10	115,404	18.3
10	20	44,219	7.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	0	0.0
-50	-30	0	0.0
-30	-20	821	0.1
-20	-15	505	0.1
-15	-10	5,054	0.8
-10	-5	12,634	2.0
-5	-1	128,867	20.4
-1	0	122,450	19.4
0	1	286,553	45.4
1	5	76,143	12.1
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Alberta (AGT) (1985)

Rate Changes:		
	Inter-Company	-30%
	Intra-Company	0%
	Local Services	31.5%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	31,526	5.0
-10	-5	100,393	15.9
-5	0	91,766	14.5
0	5	71,070	11.3
5	10	88,751	14.0
10	20	81,489	12.9
20	30	84,648	13.4
30	40	39,165	6.2
40	50	44,219	7.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	190	0.0
-75	-50	1,137	0.2
-50	-30	5,054	0.8
-30	-20	5,054	0.8
-20	-15	7,580	1.2
-15	-10	12,512	2.0
-10	-5	61,397	9.7
-5	-1	88,640	14.0
-1	0	42,122	6.7
0	1	46,646	7.4
1	5	362,696	57.4
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Alberta (AGT) (1985)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	0%
	Local Services	66%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	11,434	1.8
-20	-10	68,617	10.9
-10	-5	51,869	8.2
-5	0	49,644	7.9
0	5	42,122	6.7
5	10	42,324	6.7
10	20	81,489	12.9
20	30	42,665	6.8
30	40	37,759	6.0
40	50	82,555	13.1
50	60	39,165	6.2
60	70	0	0.0
70	80	39,165	6.2
80	90	0	0.0
90	100	44,219	7.0

$ Change in Bill		Number	Per Cent
-1000	-100	442	0.1
-100	-75	884	0.1
-75	-50	5,054	0.8
-50	-30	12,634	2.0
-30	-20	0	0.0
-20	-15	12,512	2.0
-15	-10	29,812	4.7
-10	-5	34,505	5.5
-5	-1	57,294	9.1
-1	0	28,427	4.5
0	1	23,171	3.7
1	5	125,736	19.9
5	10	302,556	47.9
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Alberta (1985)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	-10%
	Local Services	20%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	112,336	17.8
-5	0	182,418	28.9
0	5	124,757	19.7
5	10	90,965	14.4
10	20	78,331	12.4
20	30	44,219	7.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	63	0.0
-50	-30	1,263	0.2
-30	-20	5,054	0.8
-20	-15	5,054	0.8
-15	-10	7,580	1.2
-10	-5	42,324	6.7
-5	-1	146,900	23.3
-1	0	86,517	13.7
0	1	124,757	19.7
1	5	213,515	33.8
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

Alberta (AGT) (1985)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	-20%
	Local Services	92%

% Change in Bill		Subscribers Affected	
From	To	Number	Per Cent
-50	-40	0	0.0
-40	-30	3,222	0.5
-30	-20	28,305	4.5
-20	-10	64,317	10.2
-10	-5	36,076	5.7
-5	0	44,388	7.0
0	5	31,931	5.1
5	10	18,951	3.0
10	20	67,566	10.7
20	30	52,744	8.3
30	40	36,007	5.7
40	50	36,007	5.7
50	60	45,482	7.2
60	70	45,482	7.2
70	80	0	0.0
80	90	39,165	6.2
90	100	0	0.0

$ Change in Bill		Number	Per Cent
-1000	-100	1,327	0.2
-100	-75	5,054	0.8
-75	-50	5,054	0.8
-50	-30	7,580	1.2
-30	-20	12,512	2.0
-20	-15	29,812	4.7
-15	-10	15,793	2.5
-10	-5	31,585	5.0
-5	-1	44,421	7.0
-1	0	23,171	3.7
0	1	5,256	0.8
1	5	88,767	14.1
5	10	157,591	24.9
10	15	205,105	32.5
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

British Columbia (1986)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	0%
	Local Services	6.7%

% Change in Bill		Subscribers Affected	
From	To	Number (In thousands)	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	0	0.0
-5	0	557	31.0
0	5	944	52.5
5	10	297	16.5
10	20	0	0.0
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change In Bill		Number (In thousands)	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	0	0.0
-50	-30	0	0.0
-30	-20	1	0.0
-20	-15	1	0.1
-15	-10	7	0.4
-10	-5	34	1.9
-5	-1	281	15.6
-1	0	234	13.0
0	1	1,240	69.0
1	5	0	0.0
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

British Columbia (1986)

Rate Changes:		
	Inter-Company	-30%
	Intra-Company	0%
	Local Services	25.5%

% Change in Bill		Subscribers Affected	
From	To	Number (In thousands)	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	43	2.4
-10	-5	245	13.6
-5	0	180	10.0
0	5	198	11.0
5	10	440	24.5
10	20	566	31.5
20	30	126	7.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number (In thousands)	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	1	0.1
-50	-30	8	0.4
-30	-20	9	0.5
-20	-15	25	1.4
-15	-10	24	1.3
-10	-5	113	6.3
-5	-1	225	12.5
-1	0	63	3.5
0	1	198	11.0
1	5	1,133	63.0
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

British Columbia (1986)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	0%
	Local Services	53.8%

% Change in Bill		Subscribers Affected	
From	To	Number (In thousands)	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	1	0.1
-20	-10	179	9.9
-10	-5	144	8.0
-5	0	81	4.5
0	5	63	3.5
5	10	90	5.0
10	20	378	21.0
20	30	369	20.5
30	40	198	11.0
40	50	171	9.5
50	60	126	7.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number (In thousands)	Per Cent
-1000	-100	1	0.0
-100	-75	1	0.1
-75	-50	3	0.2
-50	-30	13	0.7
-30	-20	25	1.4
-20	-15	24	1.3
-15	-10	59	3.3
-10	-5	90	5.0
-5	-1	144	8.0
-1	0	45	2.5
0	1	63	3.5
1	5	836	46.5
5	10	494	27.5
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

British Columbia (1986)

Rate Changes:		
	Inter-Company	-10%
	Intra-Company	-10%
	Local Services	12.6%

% Change in Bill		Subscribers Affected	
From	To	Number (In thousands)	Per Cent
-50	-40	0	0.0
-40	-30	0	0.0
-30	-20	0	0.0
-20	-10	0	0.0
-10	-5	252	14.0
-5	0	306	17.0
0	5	378	21.0
5	10	566	31.5
10	20	297	16.5
20	30	0	0.0
30	40	0	0.0
40	50	0	0.0
50	60	0	0.0
60	70	0	0.0
70	80	0	0.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number (In thousands)	Per Cent
-1000	-100	0	0.0
-100	-75	0	0.0
-75	-50	0	0.0
-50	-30	3	0.2
-30	-20	6	0.3
-20	-15	9	0.5
-15	-10	25	1.4
-10	-5	101	5.6
-5	-1	261	14.5
-1	0	153	8.5
0	1	548	30.5
1	5	692	38.5
5	10	0	0.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

British Columbia (1986)

Rate Changes:		
	Inter-Company	-50%
	Intra-Company	-20%
	Local Services	74.6%

% Change in Bill		Subscribers Affected	
From	To	Number (In thousands)	Per Cent
-50	-40	0	0.0
-40	-30	2	0.1
-30	-20	106	5.9
-20	-10	180	10.0
-10	-5	72	4.0
-5	0	45	2.5
0	5	63	3.5
5	10	90	5.0
10	20	234	13.0
20	30	315	17.5
30	40	198	11.0
40	50	198	11.0
50	60	171	9.5
60	70	0	0.0
70	80	126	7.0
80	90	0	0.0
90	100	0	0.0

$ Change in Bill		Number (In thousands)	Per Cent
-1000	-100	3	0.2
-100	-75	2	0.1
-75	-50	13	0.7
-50	-30	25	1.4
-30	-20	47	2.6
-20	-15	36	2.0
-15	-10	54	3.0
-10	-5	108	6.0
-5	-1	117	6.5
-1	0	0	0.0
0	1	63	3.5
1	5	467	26.0
5	10	863	48.0
10	15	0	0.0
15	20	0	0.0
20	30	0	0.0
30	50	0	0.0
50	100	0	0.0
100	1000	0	0.0

CHAPTER 10

Measures to Alleviate the Potential Adverse Effects of Current and Alternative Pricing Systems

CHAPTER 10

TABLE OF CONTENTS

10.1 Introduction

In Chapter 1, some pressures for changing current Canadian telephone rating practices and rate structures, including alleged imbalances in cost/revenue relationships for both local and long-distance services, are identified. Chapter 3 provides the simulation results of a range of scenarios in which long-distance rates were reduced and the accompanying increases in local rates were estimated. If substantial decreases in long-distance rates were implemented, alternative local rate measures aimed at mitigating any adverse effects of this new telephone pricing approach might have to be considered.

The purpose of this chapter is to identify alternative local rate structures and other measures that could assist in alleviating any adverse effects of current and alternative telephone service pricing. It also explores alternative local rate structures which arise as potential solutions to economic inefficiencies that may be inherent in present rating structures. The chapter is primarily concerned with alternative local rate structures and other measures that could be introduced to counterbalance any adverse impact of higher local rates on the universal availability of affordable telephone service or to improve its current availability and affordability.

Section 10.2 discusses adjustments to current rating practices that could be considered within a flat-rate framework. Section 10.3 analyses issues associated with pricing local services on a measured basis. Section 10.4 deals with various special measures that could be adopted to maintain or improve the universal availability of affordable telephone service, including direct subsidization or assistance to individuals, subsidies to telephone companies and the provision of low-cost budget services. Section 10.5 provides an overview of the enabling legislation of provincial and federal telecommunication regulators with respect to the ability of regulators to consider differential rate treatment for groups of subscribers as a means of maintaining universality.

10.2 Adjusting Rating Practices within a Flat-Rate Framework

Adjustments to rating practices, while still maintaining the practice of flat-rate pricing of local services, could be used to alleviate a number of

the adverse effects of current and alternative pricing systems. For instance, specific adjustments to local rate structures could be made to reduce the economic inefficiencies of current pricing approaches and to recover costs in a manner more in accordance with the user-pay principle (i.e. recovering costs from those who cause them). Furthermore, these approaches could be used to generate additional revenues in the event of a revenue shortfall resulting from long-distance rate decreases.

Creating a separate rate for access

It is generally recognized that costs are incurred by telephone companies in allowing customers to access the network, and that they are not for the most part usage sensitive. What is at issue is the amount and the manner by which these costs should be recovered from different services (see Chapters 1 and 8). Presently, local rates provide for both access and usage. Amending tariffs to unbundle the two components of local service rates could habituate users and other involved parties to the concept of explicit recovery of non-traffic sensitive or access costs. Recovery of access costs in this manner would depend in part on resolution of the opposing opinions referred to in Chapter 8. In that chapter, reference is made as to whether access costs should be recovered by a flat charge to each individual user or whether they should instead be apportioned to the various services provided on the public telecommunications network and then recovered through the respective rates for these services.

Information provided to this examination also shows that the cost of providing access to the telephone network on a per access-line basis is higher in rural exchange areas than in urban ones. If this pricing approach of separating charges for access to network and local usage were implemented on a full cost recovery basis without rate averaging, the tariffs for access in rural areas could be extremely high.

Compressing the number of rate groups

Information provided to the examination by the telephone companies indicates that the cost of providing local service per access line decreases as the number of access lines in an exchange area increases. As a result of the

application of the value-of-service principle, however, rates for local service are higher in exchanges with a greater number of access lines.

Telephone company studies, such as the 1984 Subscriber Characteristic Profile Study undertaken by Bell Canada,[1] show that residence and business customers in large communities tend to make more calls than those in small communities. Nevertheless, the higher cost associated with the greater calling volume of customers in exchanges with a larger number of access lines does not in itself justify current rate differentials among rate groups.

An alternative rating approach could be to reduce the number of rate groups. At an extreme, rate groups could be eliminated altogether. However, as most subscribers are concentrated in urban-centre rate groups, to obtain even a modest increase in local revenues without changing rates for urban centre exchanges would necessitate significant basic local rate increases in small exchange areas. Where the difference between the lowest and highest rate group is small for local residence service, the elimination of rate groups could be more feasible.

Reducing or eliminating residence/business rate differentials

Available evidence suggests that differences in the cost of providing local service to residence and business customers may differ from associated rate differentials. While access costs for residence and business customers are similar, local business calling is more heavily concentrated in peak traffic periods.

An alternative rating approach would be to increase local revenues by reducing existing rate differentials. Reducing or eliminating rate differentials would also mean relaxing the value-of-service principle discussed in Chapter 2. Whether it would mean moving closer to a system in which costs are recovered from those who cause them has yet to be determined.

Making extended area service more generally available

There is always pressure on telephone companies to expand extended area service (EAS) to reduce long-distance expenses to nearby exchanges. As indicated in Chapter 2, most companies have already implemented EAS widely in their territories. Whether continued expansion of EAS is an appropriate

objective depends in part on whether those who benefit (rather than the general body of subscribers) pay most of the associated costs.

Many of the alternative pricing approaches identified in this section, including creating a separate rate for access, compressing the number of rate groups and reducing rate differentials between residence and business customers, would tend to have the greatest impact on rural residential customers. If local telephone rates were restructured as discussed here, rates for these customers would be substantially higher. In part, this reflects the current low level of such rates as compared to those for other customers.

10.3 Local Measured Service

10.3.1 Introduction

Many telephone companies have argued that local measured service (LMS) is the local service pricing approach that best redresses existing anomalies within the current flat-rate structure. An LMS plan charges customers for local telephone service on the basis of usage. It can take into account one or more of four pricing elements: (1) duration, (2) time of day, (3) distance and (4) the number of calls made.

Most industrialized countries outside North America use some form of LMS to price basic local services. In the United States as well, LMS is being introduced in an increasing number of states -- usually on an optional basis, but in a few cases on a mandatory basis.

In Canada, numerous surveys of customer attitudes suggest that most subscribers are against LMS. The extent of customer resistance was evidenced by the withdrawal of an LMS trial by Bell Canada in 1979 because of public opposition. British Columbia Telephone has included in its construction program a plan to conduct a market trial for LMS in one or more exchanges. The plan has been postponed repeatedly, but it is now scheduled for 1988, subject to an application for CRTC approval.

For the purposes of this examination, telephone companies across Canada were asked to provide any studies they had conducted on the feasibility of furnishing LMS. Bell Canada and B.C. Tel provided the results of their studies. MT&T stated that local calling studies are now in progress. AGT indicated that two field trials had been carried out. Other companies reported no studies.

10.3.2 Benefits of Local Measured Service

It is frequently argued that LMS would promote greater economic efficiency and be more consistent with the user-pay principle. With increased use of the local network -- for example, by personal computer users -- some telephone companies see LMS as an important vehicle for recovering additional costs associated with such usage. With respect to greater efficiency, it is argued that because each call would represent a distinct charge to the customer, users would seek to minimize telephone charges by reducing unnecessary calling and the telephone company would be able to expand its local facilities at a slower pace than if local usage were "free". Thus, customers would be encouraged to use the network more efficiently and telephone companies would be able to allocate their resources more effectively. The amount of any such benefits would depend on the extent to which demand for local usage is price sensitive.

In terms of the user-pay principle under LMS, it could be argued that, to be fair, customers should pay for the costs they generate. To the extent that LMS more closely matches revenues with causal costs, it is arguably more equitable than existing rate structures. It should be noted, however, that LMS rate structures must be designed to reflect closely the underlying structure of costs if gains in efficiency are to be realized. Under an LMS plan, calls made during "busy" hours could be priced closer to the marginal costs of providing additional facilities, such that the cost of providing service is fully recovered from customers who generate those costs. Calls made during "shoulder" hours could be priced sufficiently high that new peak demand is not created, and sufficiently low that calls are not shifted to peak hours, so that no additional plant and equipment are required to service this demand. Calls at "off-peak" hours could be priced lower, because only equipment that would otherwise remain idle is used to provide service.

10.3.3 Disadvantages of Local Measured Service

Increased capital costs

To charge customers for each local call and to account for the duration of the call, the distance and the time of day, involve substantial

capital costs for measurement. In 1983, B.C. Tel estimated that to introduce LMS to 90 per cent of its territory the incremental capital cost would be $21 per line.[2] In the company's view, however, this cost has decreased with extensive network digitization.

Increased billing and other expenses

The increase in bill-processing costs that would result from LMS is considerable. US experience shows that the volume of customer inquiries and complaints would increase substantially with the introduction of LMS. In addition, public relations expenses associated with informing customers of the more complicated LMS pricing schemes would be incurred. All of these result in higher operating expenses. Some US estimates of measuring and billing costs are as follows:[3]

Washington State	$0.0049 per call
Oregon	$0.0060 per call
New York State	more than $0.010 per call.

Negative customer reaction

Many customers do not like LMS. They see it as the telephone company's way of charging more without having to justify rate increases. Customers also feel that they have less control over their telephone expenses under LMS. Finally, many do not like to deal with the complexities in pricing and billing associated with LMS.

Negative impacts on economic efficiency

While charging for local calling based on marginal costs would, in theory, generate economic gains by discouraging calling where costs exceed perceived value, in practice there is a limit on the extent to which rates can vary over times of day or days of the week. In practice, network utilization and, hence, marginal costs vary over time and any usage rate applicable to a particular rating period would, for most of that period, differ from marginal cost. LMS would thus work very imperfectly, resulting in economic

inefficiencies for those periods when rates exceed marginal costs. One study concluded that because of this LMS is likely to be economically inefficient when all factors are considered.[4]

Other disadvantages

Other factors that will have an impact on the desirability of LMS include the possibility of it leading some users to seek alternatives to using the local exchange network. Such avoidance or "bypass" of the local network by high-volume users could, in the short run, result in additional costs to the average subscriber in order to recover stranded investment costs.

The recovery of all costs associated with local usage by subscribers on the local network through measured pricing may also adversely affect telephone company productivity in this area. The guarantee of reimbursement of all costs associated with providing local service may weaken incentives to minimize such costs. Furthermore, telephone company costs of capital could be increased as a result of the uncertainty of the local revenue stream under LMS.

To implement complicated pricing schemes such as these would require detailed information on the marginal cost of usage at busy hours and the price elasticity of demand for usage. Obtaining such data is a difficult exercise and the results may not always be reliable.

10.3.4 Other Issues Related to Local Measured Service

Mandatory versus optional LMS

US experience indicates that when LMS is offered on an optional basis, the subscription rate is very low (about 10 per cent). Most customers who opt for measured services are low-volume users whose monthly bills are lower under LMS. Other things being equal, total local revenues under a mixed LMS and flat-rate environment would likely decrease. At the same time, the cost of providing service could increase. This would put upward pressure on rates for other services.

Offering LMS in all exchanges versus only in large urban areas

According to cost/revenue information provided by Bell and B.C. Tel, approximately 70 per cent of all costs of providing monopoly local services are traffic insensitive. Furthermore, local usage in rural exchanges is comparatively low. Differences in usage between high- and low-volume customers are also highest in large urban exchange areas, and it is estimated by some telephone companies that the cost of installing measurement equipment in rural exchanges to replace older technology is prohibitively high. It is therefore possible that LMS would only be economic in urban areas.

10.3.5 Conclusions

The issues related to the introduction of LMS have been discussed extensively in the telecommunications literature and in US rate proceedings. No attempt has been made here to review all the available information.

When LMS is compared with flat-rate pricing, benefits associated with LMS include cost savings related to demand repression and greater adherence to the user-pay pricing principle. The costs include measurement costs, higher operating expenses and decreases in the value of telephone service associated with reduced telephone usage.

Weighing these costs and benefits would require, among other things, further information on demand sensitivity and the costs of providing local service. Generally speaking, it appears that more Canadian data are required and choices could only be made after careful consideration of the various costs and benefits in the Canadian context.[5]

10.4 Maintaining or Improving Universal Availability of Affordable Telephone Service

10.4.1 Introduction

Chapter 3 examines a number of scenarios in which the rates for long-distance telephone service were reduced and those for local services were concomitantly increased. The impact of higher local rates on the universal availability of affordable telephone service is explored in Chapter 4. The general conclusion is that local rate increases would be unlikely to lead to any

significant reductions to telephone service penetration levels, even for price increases of as much as 100 per cent.

This section addresses specific measures that could be undertaken either by the telephone companies or by government in the event that drop-offs were to occur. Measures could also be adopted to improve the current availability of affordable telephone service. Whereas the overall telephone penetration level for telephone service in Canada is approximately 98 per cent, there are some income groups and regions of the country for which the penetration level is much lower. Hence, some of these measures could be adopted within the current environment.

10.4.2 Directed Subsidization of Telephone Service

a) Overview

One option for policy consideration relative to maintaining or improving the universal availability of affordable telephone service is directed subsidization, either to individuals or to regions. The former approach targets individuals who need specific help. The latter targets specific regions of the country where the provision of telephone service is difficult and expensive.

b) Directed subsidization of individuals

Directed subsidization of individuals may be done in two ways. First, it could involve the provision of special rates by the telephone companies. Second, support for or reimbursement of the costs of telephone service could be provided by governments.

i) Discriminatory rates - lifeline services

Providing telephone service to individuals at special rates (i.e. lower than those charged to the general subscriber body) to people who meet a specified "means test" has been termed the provision of lifeline services. There has been no experience to date in Canada with lifeline services; however, some use has been made of such services in the United States. Table 10.1 presents five lifeline programs that have been implemented in that country. The programs differ in terms of: (a) sources of funding, (b) eligibility, (c)

TABLE 10.1
United States Lifeline Service

State	Initiated by	Funding	Eligibility	Number of Subscribers	Eligible Classes of Service	Description of Plan
Arkansas	PUC	Telephone Co. Rate-payers	Food Stamp Program	1 144	Measured Only	Rate set at 33% of 1FR, (20 Call Allow) $5.39 (Little Rock)
California	Legislature	Tax on InterLATA Carriers	Income Under $11 000	500 000	Measured if Avail. Otherwise Flat	Rate set at 50% of 1FR or 1MR (30-60 Call Allow) $5.72/mo. (L.A.)
District of Columbia	PUC	Telephone Co. Rate-payers	Over 65 Fed Stat Criteria For Energy (150% Pov Lev)	Not Available	Message Rate	$5.54/mo. (30 Call Allowance)
Maryland	Legislature	General Tax Revenue Spec Hardship, Low Income, Aged	Fed Welfare Standards for Disabled	Not Available	Message Rate	$6.23/month (30 Call Allowance)
New York	PUC	Telephone Co. Rate-payers	NY State Financial Assistance	Not Available	Message Rate (Measured, Flat-Rt Svc. Under consid)	Rate set at $2.77 below standard rates $7.27 (New York City)

Notes: Rates were converted to $CAN at an exchange rate of 1.385.
1FR = individual-line flat rate
1MR = individual-line measured rate

Source: NARUC Survey on State Lifeline Telephone Service, 1985; and information from Public Utilities Commissions.

classes of service provided, and (d) service features. Some were initiated by regulatory bodies and others by legislation. Lifeline services in the United States are offered on a measured basis. They are priced at 33 to 50 per cent of the individual-line residence rate with a 20-60 local call allowance. All calls over this limit are billed at the regular LMS rate. Where measured service is not available -- for example, in some areas of California -- unlimited local calling is provided.

Rate levels for lifeline services are usually prescribed either by the sponsor of such programs or by an enabling statute. According to a 1985 NARUC survey,[6] lifeline programs are at the planning stages in another ten US states.

Some of the reasons for the scarcity of lifeline programs in the United States include:

1. State regulators and telephone companies believe that existing budget services, usually a low-volume measured service, make lifeline service unnecessary.

2. Legal impediments to offer such a service exist in some states.

The implementation of lifeline services in Canada would require consideration of eligibility, funding, service features and rate levels.

Eligibility

Eligibility for lifeline service could be tied to household income, but it might also include appropriate factors related to age or physical handicap. Since the telephone companies are not well equipped to deal with determining and reviewing such criteria, eligibility for standard government support programs or other such means tests has been suggested to help decide who should receive lifeline service.

Funding

The revenue loss to the telephone companies as a result of providing service at rates lower than normal could be recovered in one or more of the

following ways: (a) a hidden charge to all other subscribers; (b) an explicit surcharge on certain services, such as long-distance; and (c) reimbursement by governments. To the extent that all subscribers benefit from maximizing access to the telephone network, it may be argued that all subscribers should bear the costs for the few who are disadvantaged.

In terms of a surcharge on long-distance services, it can also be argued that any benefits received as a result of lower long-distance rates that give rise to associated local rate increases, should be used to offset any problems that arise. The third option, reimbursement by governments, would function on the basis of periodic identification of revenue shortfalls resulting from the provision of lifeline service by the telephone companies and the collection of necessary funds from appropriate governments. With this cost-recovery mechanism, citizens in general would bear the burden of providing telephone service to the disadvantaged.

Service features and rate levels

Implementation of lifeline services in Canada would require the establishment of the levels of service and the rates to be paid by eligible individuals. The level of service could vary from single-party to two-party and multi-party service, depending on individual telephone company circumstances. In addition, appropriate charges for services would need to be fixed, either in relation to individual ability to pay or to general economic conditions in the local community or geographic region.

In the 1985/86 Manitoba Telephone System General Rate-Increase proceeding, the Manitoba Anti-Poverty Organization (MAPO) and the Manitoba Society of Seniors jointly intervened and proposed lifeline rates for certain financially disadvantaged persons. The issues of eligibility, program administration, funding, legal impediments, service features and rate levels were extensively canvassed during that proceeding.

In Order No. 59/86,[7] the Manitoba Public Utilities Board rejected the lifeline proposal. It noted that special rates have not been adopted by other Canadian jurisdictions and stated that many social and legal issues had to be resolved before such rates could be implemented (including applications of the Canadian Charter of Rights and Freedoms, and determining whether such special rates would discriminate against other residential subscribers). In

arriving at its decision, the Manitoba board also stated that US lifeline rates are significantly higher than equivalent rates being requested by Manitoba Telephone System. Moreover, it expressed the view that the decision on imposing such rates should rest with a higher authority.

ii) Government assistance to individuals

In the second method of directed subsidization of individuals, the telephone companies would play no role. Instead, subsidization would be undertaken by governments. Under this program, a telephone allowance (such as a cash subsidy) to meet part or all of the cost of subscription could be granted to individuals in need. To avoid situations where some recipients might use the cash subsidy for other purposes, thereby defeating the purpose of the program, the allowance could be given in a form such as telephone stamps which could be used only for telephone service payments. This program could utilize the existing system of social assistance to determine eligibility criteria and program delivery.

There are a number of existing social benefit programs in Canada that provide subsidies to people in need. These subsidies usually come in the form of an income supplement to those who demonstrate that their financial resources are insufficient to support defined "basic needs". Such needs may include food, clothing, shelter, household requirements and utilities (including telephone service). Most of these subsidies are provided already under the Canada Assistance Plan (CAP). For persons aged 65 or over, there is also the Guaranteed Income Supplement (GIS), entitlement to which is based on income other than the Old Age Security (OAS) pension.

Under CAP, the federal government shares 50 per cent of the cost to the provinces of providing social assistance programs and welfare services to persons in need. While conditions for cost sharing are specified by the federal government, the provinces are responsible for the design, comprehensiveness and delivery of these programs to the public. Consequently, social assistance rates, including indexation, are determined by provincial authorities.

People aged 65 or over may qualify for the GIS in addition to the old age pension. Both OAS and GIS rates are indexed to Consumer Price Index (CPI) increases. Assistance is provided to persons in need based on budget estimates for basic requirements and items of special need. For most provincial programs,

there are no specific provisions for telephone service under utility requirements. In fact, in most provinces utilities allowances cover only electricity and water. As a result, increases in telephone bills would not be considered as increases in need and they would have to be covered by the fixed amount of the benefit. Still, there are exceptions. The provinces of Prince Edward Island and Saskatchewan, for example, have included telephone service as a utility requirement. The Province of British Columbia provides shelter allowance, and this includes basic telephone costs. Despite differences in the type of allowances and the amount of benefits paid under CAP, most individuals in special situations, such as those under medical assistance, can in many cases receive telephone assistance if such a need can be specifically demonstrated.

Table 10.2 summarizes telephone allowance under the Canada Assistance Plan for people in need of either general or special assistance. The use of government subsidies in this manner to maintain or improve the universal availability of affordable telephone service would require further study of existing programs in each province and directed extension of those programs to meet selected objectives relative to universality.

There are a number of advantages in using existing social assistance programs to target subsidies to telephone subscribers:

1. Social assistance programs are targetted at individuals in need; a fairly large proportion of low-income, elderly or disabled persons are reached by the various programs. These programs have identified the most vulnerable groups in all regions and have defined their characteristics. Furthermore, program field staff are frequently in contact with them.

2. Provincial social-assistance programs are existing delivery systems. As a result, the additional administrative costs associated with the delivery of telephone allowances would be small.

3. The staff of the existing social assistance programs have the experience for effective program delivery.

4. Telephone companies are not involved. Confidentiality of recipients' personal information therefore would be maintained.

TABLE 10.2
Telephone Allowance Provided Under CAP by Province

Province or Territory	Telephone Allowance
Newfoundland	Disabled persons may be granted the actual amount payable for basic service.
Prince Edward Island	Basic utility requirement includes telephone service. An allowance may be granted to cover the cost of installation and maintenance of a telephone only for reasons of safety or special situations.
Nova Scotia	Under some municipal social assistance programs, when a telephone is required for medical reasons or where isolation may lead to a high risk of child abuse, the basic charge for service and equipment may be allowed.
Manitoba	Under the Municipal Assistance Program, telephone allowances are provided where deemed necessary for special cases.
Saskatchewan	Under the Saskatchewan Assistance Plan, persons in need receive, under general service assistance, an amount equal to the minimum basic rate for one telephone. Handicapped persons may receive a telephone allowance for a special-service telephone.
Alberta	Telephone allowance may be paid to those on medical assistance. A recoverable allowance of up to $100 may be paid to meet telephone deposit requirements.
British Columbia	Shelter allowance covers the rate of one single-line residence telephone.
Yukon	Telephone allowance may be provided if it is necessary for work, emergency medical care or other special circumstances.
Northwest Territories	Telephone allowance may be provided when it is deemed necessary for safety, well-being, rehabilitation, emergency medical care or other special circumstances.

Note: Does not include provinces providing no telephone allowances.

One disadvantage of providing telephone subsidies via existing social assistance programs is the fact that these programs may not be able to reach all those who could be detrimentally affected by higher telephone prices. This is because some people, for example the working poor, may be seriously affected by telephone prices, but they may not qualify for social assistance under existing criteria.

Insofar as some of the social assistance programs under the Canada Assistance Plan provide telephone allowances, the majority are intended for people in special circumstances. Furthermore, program benefit adjustments are not always made immediately after telephone rate changes. As noted, while the federal government has specified conditions for cost sharing, responsibility for design and delivery of social assistance rests with the provincial governments. Thus, the implementation of a fully-indexed telephone allowance under basic assistance is, in the last instance, dependent upon provincial initiatives respecting such a subsidy.

The remaining portion of this section examines a tax mechanism that could reach potential households in need. It would provide a telephone subsidy in the form of a refundable tax credit provided through the income tax system. The telephone tax credit scheme could be designed to provide assistance to low and middle-income families in meeting the costs of rising local rates. Qualified families could simply attach copies of their telephone bills to their income tax return and claim the credit. This tax credit could be formatted based on the structure of the present Child Tax Credit. It might work as follows:

1. The maximum credit could be set equal to the difference between present local rates and any increased rate, multiplied by the number of months such increases were in effect during the year.

2. Each household would be restricted to claim credit on the local rate increase for one telephone.

3. The credit would be payable in full if the net annual household income in the previous year did not exceed $X.

4. If the net household income was greater than $X, the maximum credit would be reduced by Y per cent of the amount by which net income exceeded $X.

5. The maximum credit could be adjusted each year depending on the level of any increase in local rates. The income ceiling, $X, could be indexed to increases in the Consumer Price Index. The percentage reduction factor, Y, could be set by the respective provincial authorities, reflecting circumstances in each province.

The following examples illustrate how this tax credit could work:

Assumptions: a) The local service rate was increased from $10 to $20 a month effective January. The total rate increase for the year is $120, and this amount is established as the maximum credit;
b) $X, the income ceiling, is set at $15 000; and
c) Y, the percentage reduction factor, is set at 5 per cent.

Example 1: A family of three has a net income of $16 663:

Maximum credit available:	$ 120.00	= a
Net household income:	$16 663.00	
Subtract income ceiling:	($15 000.00)	
Difference:	$ 1 663.00	
5 per cent of difference:	$ 83.15	= b
Credit allowed (a - b):	$ 36.85	

Example 2: A family of three has a net income of $15 001:

Maximum credit available:	$ 120.00	= a
Net household income:	$15 001.00	
Subtract income ceiling:	($15 000.00)	
Difference:	$ 1.00	
5 per cent of difference:	$ 0.05	= b
Credit allowed (a - b):	$ 119.95	

These two examples show that the family with an income of $16 663 (the Statistics Canada Low Income Cut-Off for a family of three living in a town with population between 30 000 and 99 999 in 1986), would get a telephone credit of $36.85. The second family, with annual income of $15 001, would get almost a full refund of basic local telephone rate increases.

Assuming an income ceiling of $15 000, a percentage reduction factor of 5 per cent and a maximum annual credit of $120, the total telephone credits would cost governments about $378 million in 1986, based on projected Statistics Canada household data. The total cost to governments of running a telephone tax-credit scheme would vary, however, depending on the associated administrative costs. Table 10.3 provides estimates of the costs of such a telephone tax credit program under various income-ceiling and amount-of-credit scenarios.

TABLE 10.3
Cost Estimates of A Telephone Tax-Credit Program

Income Ceiling	Maximum Annual Credit		
	$30	$60	$120
	($ million)		
$10 000	61	127	254
$15 000	89	183	378
$20 000	119	246	497

One disadvantage of using a tax credit mechanism to provide subsidies is that the refund would be paid only once a year. In some cases, telephone service may not be affordable on a monthly basis and a once-a-year subsidy may therefore not be fully effective.

c) Subsidies to telephone companies

An alternative method of maintaining or improving availability of affordable telephone service is the granting of subsidies to telephone companies to provide or improve service to selected geographical areas. Both in Canada and the United States, there have been many programs that have given subsidies to telephone companies in their provision of telephone service. In Canada, subsidies provided to telephone companies have often taken the form of financial assistance to capital projects which were needed to bring telephone service to remote communities. Some examples of such regionally-targetted projects follow.

Northern Communications Assistance Program (NCAP)

This program was in effect from 1976 to 1983. Under the program, the Government of Canada contributed approximately one-half of the costs for central office equipment and outside plant as well as satellite rentals to assist the telephone companies in bringing telephone service to remote communities in the Northwest Territories. Without such subsidies, it is possible that telephone service would not have been provided to these remote communities.

Minimum revenue guarantee for Chesterfield Inlet

From December 1977, Bell Canada had a five-year minimum revenue guarantee arrangement with the Government of Canada for Chesterfield Inlet on the West Coast of the Hudson Bay in the Northwest Territories. Under this arrangement, the federal government guaranteed a minimum of $50 000 per year long-distance revenue to Bell Canada. If actual annual revenues in any year amounted to less than $50 000, the government would pay to Bell Canada the amount of the shortfall in the following year. A satellite system was used to provide the service and the agreement was terminated on 31 December 1981.

Remote Northern Project

The Government of Ontario contributed one-half of the capital costs as a one-time payment to build a network of nine earth stations in order to improve network facilities to communities in Remote Northern Ontario. The project was completed in 1978. There are similar subsidy programs to cover unusual expenses for long-distance satellite service to remote communities in other provinces.

US examples

In the United States, cost subsidies have been operating on a much larger scale than in Canada. Recognizing that telephone companies serving sparsely populated or rural areas may have high facility costs per subscriber line, the US Government, through the Rural Electrification and Telephone Revolving Fund administered by the Rural Electrification Administration (REA), provides direct low-interest loans to some 1 000 local telephone companies operating in rural areas. In addition, the REA provides loan guarantees and administers the Rural Telephone Bank as a supplemental source of financing. In the aggregate, these sources provided about $560 million in loans and loan guarantees in 1984.

10.4.3 Non-Directed Means of Ensuring Universality - Budget Services

Low cost, non-directed budget services provide a means of overcoming the discriminatory and administrative problems of some of the directed subsidies discussed above. Such services could serve much the same function as lifeline services in providing basic communications at a low price to those in need. The following types of service might be considered for budget services:

Two-party service

For Canadian telephone companies regulated by provincial regulatory boards, two-party residence service is not considered a budget service. It is usually offered as a standard service in areas where individual-line service (ILS) is not available, but may also be offered in an area with ILS. Hence, rates for this service are only marginally lower than ILS.

Bell Canada and B.C. Tel were directed by the CRTC to price residence two-party service as a budget service in Telecom Decision CRTC 79-23[8] and Telcom Decision CRTC 81-3,[9] respectively. At present, two-party service rates are about two-thirds of ILS rates in Bell territory and 51 to 60 per cent of ILS rates in B.C. Tel serving areas.

In these two decisions, the CRTC stated that pricing two-party service at this level would promote universal access to telephone service and would also be consistent with the value-of-service rating principle. Telephone companies have estimated that in areas where individual-line service is generally available, the cost of providing two-party service is probably not lower and may be even higher than that for ILS. Furthermore, usage may not be reduced but may instead be time shifted under two-party service.

Low-volume measured service

At present, measured service is not offered to residence customers anywhere in Canada. In the United States, however, a "low-use measured service" is usually provided as a budget service wherever LMS is available. Substantial capital costs would be required if Canadian telephone companies were directed to provide LMS solely as a budget service.

Pay telephone service

At one time, pay telephone service was provided by Bell Canada in selected locations at a lower rate than the prevailing one. This practice was discontinued in accordance with provisions in Telecom Decision CRTC 77-8.[10] Some parties have proposed that pay telephones could be a budget service option if they were priced at lower rates in selected locations.

Budget services have been criticized as being inefficient, remedial measures. They are not targetted -- i.e. they are available to all telephone subscribers, regardless of their income level. To the extent that the subscribers who would find telephone service least affordable are those with a limited income, non-targetted discount services may not be an efficient means of ensuring universal availability of telephone service at an affordable price.

10.5 Enabling Legislation of the Federal and Provincial Telecommunication Regulators

This section will provide an overview of the extent to which the establishment of budget, lifeline and subsidy programs would be possible within the existing Canadian legislative framework. In eight of the ten provinces, jurisdiction over local and long-distance telephone rates is granted to the provincial public utilities boards or commissions pursuant to their enabling legislation. In Prince Edward Island, this jurisdiction is granted to the PUC pursuant to the Electric Power and Telephone Act.[11] In Ontario, jurisdiction over telephone rates is granted to the Ontario Telephone Service Commission pursuant to the Telephone Act.[12] At the federal level, the Railway Act[13] details the CRTC's jurisdiction in this area. (Excerpts from the relevant federal and provincial legislation are provided in the Appendix to this chapter.)

All of these statutes provide that rates are to be either just or fair and reasonable. In British Columbia and Saskatchewan, provincial legislation describes when a rate is unjust; other provincial statutes are silent. In addition, the B.C., Nova Scotia and Newfoundland statutes regarding telephone rate regulation provide that rates must be charged equally under substantially similar circumstances and conditions in respect of service of the same description. The Railway Act also contains a "similar circumstances" clause, although it applies to traffic of the same description.

The B.C. statute provides that its commission may declare, by regulation, the circumstances and conditions that are considered substantially similar, while the Nova Scotia and Newfoundland acts provide that their respective boards may, also by regulation, declare what shall constitute similar circumstances and conditions. It appears from the different wording that British Columbia regulates on a case-by-case basis in this respect, while Nova Scotia and Newfoundland regulate prospectively and generally. The Railway Act does not specify when circumstances will be deemed similar.

All of the statutes, save those of the provinces of Quebec and Saskatchewan, contain similarly worded provisions prohibiting unjust discrimination or undue preference in respect of telephone rates. In fact, Saskatchewan's act provides that, in determining whether rates are just and

reasonable, the commission shall have regard to its rate policies, including policies that give preferential treatment to certain persons or groups. The Railway Act also prohibits unjust discrimination in respect of services and facilities, while the B.C. and Manitoba statutes prohibit unjust discrimination in respect of service.* In addition to prohibiting unjust discrimination in respect of telephone rates, the Nova Scotia and Newfoundland acts prohibit unreasonable prejudice or disadvantage "in any respect whatsoever."

The Ontario legislation and the Railway Act provide that the burden of proving that discrimination is not unjust lies with the telephone company. The B.C. act and the Railway Act provide that the respective commissions may determine, as questions of fact, whether similar circumstances exist or whether there has been unjust discrimination. The statutes of the other provinces are silent on these matters.

The Railway Act and the acts of B.C., Alberta, Manitoba, New Brunswick, Nova Scotia, P.E.I. and Newfoundland provide that the regulator may suspend, postpone or disallow rates and make orders. Whether or not a regulator will be free to introduce a budget or lifeline telephone plan whereby certain disadvantaged groups may receive basic telephone service at reduced rates will depend on whether the enabling legislation precludes the charging of different rates for the same service.

It appears, however, that there would be no statutory impediment to the introduction of a targetted subsidy program delivered as part of an existing social assistance program for disadvantaged telephone users. A number of different social assistance programs for targetted groups are currently provided by provincial and federal governments, and neither the provincial regulators' enabling legislation nor the Railway Act precludes the creation of a similar type of program to ensure that the disadvantaged have access to telephone service.

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* Subsection 10.4.2(i) discusses the Manitoba board's concerns about the possibility of discriminatory pricing. MAPO et al. has filed a motion for leave to appeal this aspect of the decision. By agreement between the parties, however, the motion has been adjourned without prejudice until Manitoba Telephone System responds to a board recommendation that it review its security deposit and installation charge policy. The company's response has been requested for 30 September 1986.

CHAPTER 10

ENDNOTES

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4. Park, R.E. and B.M. Mitchell, Optimal Peak-Load Pricing for Local Telephone Calls, The Rand Corporation, June 1986.

5. A good bibliography of studies on LMS is provided in Ibid.

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10. Canadian Radio-television and Telecommunications Commission, "Bell Canada, Increase in Rates," Telecom Decision CRTC 77-8, 1 June 1977: pp.17-20.

11. Electric Power and Telephone Act, Statutes of Prince Edward Island 1984, c.20, as amended.

12. Telephone Act, Revised Statutes of Ontario 1980, c.496, as amended by Statutes of Ontario 1983, c.71, ss.11 and 12.

13. Railway Act, Revised Statutes of Canada 1970, c.R-2, as amended.

CHAPTER 10

APPENDIX

Relevant Federal and Provincial Legislation Respecting Anti-Discriminatory Rating

1. British Columbia Utilities Commission:

Utilities Commission Act, Statutes of B.C. 1980, c.60, as amended.

a) Anti-discrimination section:

Discrimination in rates

65. (1) A public utility shall not make, demand or receive an unjust, unreasonable, unduly discriminatory or unduly preferential rate for a service furnished by it in the Province, or a rate that otherwise contravenes this Act, regulations, orders of the commission or other law.

(2) A public utility shall not, as to rate or service, subject any person or locality, or a particular description of traffic, to an undue prejudice or disadvantage, or extend to any person a form of agreement, a rule or a facility or privilege, unless the agreement, rule, facility or privilege is regularly and uniformly extended to all persons under substantially similar circumstances and conditions for service of the same description, and the commission may, by regulation, declare the circumstances and conditions that are substantially similar.

(3) It is a question of fact, of which the commission is the sole judge, whether a rate is unjust or unreasonable, or whether, in any case, there is undue discrimination, preference, prejudice or disadvantage in respect of a rate or service, or whether a service is offered or furnished under substantially similar circumstances and conditions.

(4) In this section a rate is "unjust" or "unreasonable" if the rate is

(a) more than a fair and reasonable charge for service of the nature and quality furnished by the utility,

(b) insufficient to yield a fair and reasonable compensation for the service rendered by the utility, or a fair and reasonable return on the appraised value of its property, or

(c) unjust and unreasonable for any other reason.

1980-60-65; 1983-10-21, effective October 26, 1983 (B.C. Reg. 393/83).

b) Related sections:

(i) Rates:

Rates

66. (1) In fixing a rate under this Act or regulations

(a) the commission shall consider all matters that it considers proper and relevant affecting the rate,

(b) the commission shall have due regard, among other things, to the fixing of a rate that is not unjust or unreasonable, within the meaning of section 65, and

(c) where the public utility furnishes more than one class of service, the commission shall segregate the various kinds of service into distinct classes of service; and in fixing a rate to be charged for the particular

service rendered, each distinct class of service shall be considered as a self contained unit, and shall fix a rate for each unit that it considers to be just and reasonable for that unit, without regard to the rates fixed for any other unit.

(2) In fixing a rate under this Act or regulations, the commission may take into account a distinct or special area served by a public utility with a view to ensuring, so far as the commission considers it advisable, that the rate applicable in each area is adequate to yield a fair and reasonable return on the appraised value of the plant or system of the public utility used, or prudently and reasonably acquired, for the purpose of furnishing the service in that special area, but, where the commission takes a special area into account, it shall have regard to the special considerations applicable to an area that is sparsely settled or has other distinctive characteristics.

(3) For this section, the commission shall exclude from the appraised value of the property of the public utility any franchise, licence, permit or concession obtained or held by the utility from a municipal or other public authority beyond the money, if any, paid to the municipality or public authority as consideration for that franchise, licence, permit or concession, together with necessary and reasonable expenses in procuring the franchise, licence, permit or concession.

Orders respecting contracts

70. (1) Where the commission, after a hearing, finds that under a contract entered into by a public utility a person receives a regulated service at rates that are unduly preferential or discriminatory, the commission may

(a) declare the contract unenforceable, either wholly or to the extent the commission considers proper, and the contract is then unenforceable to the extent specified, or

(b) make any other order it considers advisable in the circumstances.

(2) Where a contract is declared unenforceable either wholly or in part, the commission may order that rights accrued before the date of the order be preserved and those rights may then be enforced as fully as if no proceedings had been taken under this section.

(ii) Services:

Improved service

30. Where the commission, after a hearing held on its own motion or on complaint, finds that the service of a public utility is unreasonable, unsafe, inadequate or unreasonably discriminatory, the commission shall determine what is reasonable, safe, adequate and fair service and order the utility to provide it.

No discrimination or delay in service

45. On reasonable notice, every public utility shall furnish to all persons applying for service, and reasonably entitled to it, who pay or agree to pay the rates established for that service under this Act or regulations, suitable service without undue discrimination or undue delay.

Exemption

46. The commission may, by order, exempt a municipality, on application, from section 45 except in a defined area, but may, on application by any person and after notice to the municipality, enlarge or reduce that area.

2. Alberta Public Utilities Board:

Public Utilities Board Act, Revised Statutes of Alberta 1980, c.P-37, as amended.

a) Anti-discrimination section:

91(1) No owner of a public utility shall

(a) make, impose or extract an unjust or unreasonable or unjustly discriminatory or unduly preferential individual or joint rate, commutation rate, travel allowance or other special rate, toll, fare, charge or schedule for any product or service supplied or rendered by it within Alberta,

(b) adopt or impose an unjust or unreasonable classification in the making of or as the basis of an individual or joint rate, toll, fare, charge or schedule for any product or service rendered by it within Alberta,

(c) adopt, maintain or enforce a regulation, practice or measurement that is unjust, unreasonable, unduly preferential, arbitrarily or unjustly discriminatory or otherwise in contravention of [illegible], or provide or maintain any [illegible] that is unsafe, improper, inadequate, or withhold or refuse any service that can reasonably be demanded and furnished when ordered by the Board,

(d) make or give, directly or indirectly, an undue or unreasonable preference or advantage to any person or corporation or to any locality or to any particular description of traffic in any respect whatsoever, or subject a particular person or corporation or locality or a particular description of traffic to any prejudice or disadvantage in any respect whatever, . . .

b) Related sections:

Investigation of utilities and fixes

72 When it is made to appear to the Board, on the application of an owner of a public utility or of a municipality or person having an interest, present or contingent, in the matter in respect of which the application is made, that there is reason to believe that the toll demanded by an owner of a public utility exceed what is just and reasonable, having regard to the nature and quality of the service rendered or of the commodity supplied, the Board

(a) may proceed to hold such investigation as it thinks fit into all matters relating to the nature and quality of the service or the commodity in question, or to the performance of the service and the tolls or charges demanded therefor,

(b) may make any order respecting the improvement of the service or commodity and as to the tolls or charges demanded, that seems to it to be just and reasonable, and

(c) may disallow or change, as it thinks reasonable, any such tolls or charges that, in its opinion, are excessive, unjust or unreasonable or unjustly discriminate between different persons or different municipalities, but subject however to such of the provisions of any contract existing between the owner of the public utility and a municipality at the time the application is made as the Board considers fair and reasonable.

Rates established by agreement

73 When, a contract between an owner of a public utility, a municipality or person for the supply of a commodity or service by means of the public utility, a rate, toll or charge is agreed on, either as a fixed or variable rate, toll or charge, or a maximum or minimum rate, toll or charge, and whether that rate, toll or charge is agreed on with respect to a present or future supply of an existing or non-existing commodity or service, then, notwithstanding anything in this Act, the Board may, on the application of the owner, municipality or person and on it being shown on the hearing of the application that the rate, toll or charge is insufficient, excessive, unjust or unreasonable, change the rate, toll or charge to some other greater or lesser rate, toll or charge, that it considers fair and reasonable.

3. Saskatchewan Public Utilities Review Commission:

The Public Utilities Review Commission Act, Statutes of Saskatchewan 1981-82 and 1982-83, c.P-45.1.

a) Anti-discrimination section:

No clear anti-discrimination section.

b) Related section:

Commission to determine reasonableness of rates

6(1) Where an application is made, the commission shall determine if, and the corporation making the application shall satisfy the commission that, the proposed new rates are reasonable and justified in the circumstances.

(2) Subject to subsection (3), in determining whether proposed new rates are reasonable and justified the commission shall have regard to:

(a) the costs of providing the particular services for which the new rates are proposed insofar as those costs can, in the opinion of the commission, reasonably be identified;

(b) the overall revenue requirements of the corporation with respect to all regulated services, including:

(i) the amounts required to meet the costs incurred by the corporation to provide all regulated services; and

(ii) the earnings necessary to ensure the financial health of the corporation, including the earnings necessary to finance a reasonable proportion of the corporation's capital investment program in a manner consistent with sound financing practices;

(c) any policies with respect to the design or structure of its rates, including policies which may give preference to certain persons, groups or classifications that, in the opinion of the commission, are related to the responsible performance of the corporation's powers and duties; and

(d) any other matters affecting rates that, in the opinion of the commission, ought to be considered.

(Subsection (3) refers to insurance premiums.)

4. Manitoba Public Utilities Board:

Public Utilities Board Act, Revised Statutes of Manitoba 1970, c.P-280, as amended.

a) Anti-Discrimination section:

(1) No owner of a public utility shall

(a) make, impose, or exact any unjust or unreasonable, unjustly discriminat[illegible] or unduly preferential, individual or joint rate, commutation rate, mileage, other special rate, toll, fare, charge, or schedule, for any product or service supplied or rendered by it within the province;

(b) without the written authorization of the board and subject to subsection (2), make, impose, exact, or collect, any rate, toll, fare, or charge, or any s[illegible] of rates, either individual or joint, for any product supplied or servic[illegible] by [illegible]

(c) adopt or impose any unjust o[illegible] bl[illegible] the basis, of any individual o[illegible] toll, fare, charg[illegible] product or service rendered [illegible] the province;

(d) adopt, maintain, or enforce any regulation, practice, or measure ent t[illegible] is unjust, unreasonable, unduly preferential, arbitrarily or unjustly di-crimi[illegible] ory or otherwise in violation of law, or provide or maintain any service that is [illegible] afe, improper, or inadequate, or withhold or refuse any service that can reasou[illegible] y be demanded and furnished when ordered by the Board;

(e) make or give, directly or indirectly, any undue or unreasonable preferer[illegible] or advantage to any person or corporation, or to any locality, or to any part[illegible] lar description of traffic in any respect whatsoever, or subject any particular [illegible] rson or corporation or locality, or any particular description of traffi[illegible] t[illegible] [illegible]ice or disadvantage in any respect whatsoever; ...

b) Related sections:

Investigation of excess charges.

64(1) Where

(a) it is made to appear to the board, upon the complaint of an owner of a public utility, or of any municipality or person having an interest, present or contingent, in the matter in respect of which the complaint is made, that there is reason to believe that the tolls or charges demanded by any owner of a public utility exceed what is just and reasonable, having regard to the nature and quality of the service rendered or of t[illegible] modity supplied; or

(b) requested to do so by the [illegible] or

(c) in the opinion of the board it is expedient to do so, on its own initiative;

the board may proceed to hold such investigation as it sees fit into all matters relating to the nature and quality of the service or the commodity in question, or to the performance of the service and the tolls or charges demanded therefor.

Order on investigation.

64(2) Upon completion of an investigation made under subsection (1), the board may make such order respecting the improvement of the service or commodity and as to the tolls or charges demanded, as seems to it to be just and reasonable, and may disallow or change, as it thinks reasonable, any such tolls or charges as, in its opinion, are excessive, unjust, or unreasonable or unjustly discriminate between different persons or different municipalities, but subject, however, to such of the provisions of any contract existing between the owner and a municipality at the time the complaint is made as the board considers fair and reasonable.

S.M., 1959 (2nd Sess.), c. 51, s. 64.

Increase or decrease of contractual rate.

65(1) Where, by any contract between an owner of a public utility and any municipality, other corporation, or person for the supply of any commodity or service by means of the public utility, the rate, toll or charge is agreed upon either as a fixed or variable rate, toll, or charge, or a maximum or minimum rate, toll, or charge, and whether the rate, toll, or charge is agreed upon with respect to a present or future supply of an existing or non-existing commodity or service, then, notwithstanding any other provision of this Act, upon the application of the owner, municipality, corporation or person, and if, upon the hearing of the application, it is shown that the rate, toll, or charge is insufficient, excessive, unjust, or unreasonable, the board may change the rate, toll or charge to such other greater or lesser rate, toll or charge, as it deems fair and reasonable.

Orders as to utilities.

77 The board may, by order in writing after notice to, and hearing of, the parties interested,

(a) fix just and reasonable individual rates, joint rates, tolls, charges, or schedules thereof, as well as commutation, mileage, and other special rates that shall be imposed, observed, and followed thereafter, by any owner of a public utility wherever the board determines that any existing individual rate, joint rate, roll, charge or schedule thereof or commutation, mileage, or other special rate is unjust, unreasonable, insufficient, or unjustly discriminatory or preferential;

(b) fix just and reasonable standards, classifications, regulations, practices, measurements, or service to be furnished, imposed, observed, and followed thereafter by any such owner;

Preferential rates from municipal utility.

82(15) Notwithstanding subsection (1), a municipality that is the owner of a public utility may, if authorized by by-law, enter into an agreement to charge an individual consumer a preferential rate; and, where the rate specified in the agreement is, in the opinion of the board, one to which clause (a) of subsection (1) would apply, the authorizing by-law shall provide that the municipality shall annually pay, from proceeds of a special levy imposed annually for that purpose to the account of the utility concerned the difference between the amount received pursuant to the agreement and the amount that would have been received had the rate been established in compliance with this Act but without reference to this subsection; and the rate used in establishing the difference shall be approved by the board.

5. Ontario Telephone Service Commission:

Telephone Act, Revised Statutes of Ontario 1980, c.496, as amended by Statutes of Ontario 1983, c.71, ss.11, 12.

a) Anti-discrimination section:

Service to be fair

106.—(1) No telephone system offering or providing a telephone service, shall,

(a) make an unwarranted discrimination against any person;

(b) give an undue advantage to any person; or

(c) subject any person to an undue disadvantage.

Onus on system

(2) Where it is alleged that a telephone system has committed an act mentioned in subsection (1), the onus of proving that the discrimination is warranted or that the advantage or disadvantage is not undue is on the telephone system.

Interpretation

(3) Charging different rates based on the nature of the use made of a telephone system is not a contravention of this section.

b) Related section:

Tariffs and rates to be filed and approved

105.—(1) Every telephone system shall file with the Commission its tariff of rates and tolls in such form and containing such particulars as the Commission requires and no system or municipality shall charge or levy any rate or toll that has not been filed with and approved by the Commission.

Public hearing

(2) Where the Commission is of the opinion that a change in a tariff of rates and tolls should not be approved without a public hearing, it shall give written notice of the time and place of the hearing to the telephone system desiring the change, and the telephone system shall, unless the Commission orders otherwise, publish, once a week for two successive weeks immediately preceding the hearing, notice of the hearing in a newspaper having general circulation in the municipality or municipalities where the change in the tariff is sought. R.S.O. 1970, c. 457, s. 105.

Rates to be just and reasonable

(3) Every rate toll charged or levied by a telephone system shall be just and reasonable.

6. Québec Régie des services publics:

An Act Respecting the Régie des Services Publics, Revised Statutes of Québec 1977, c.R-8.

a) Anti-discrimination section:

No anti-discrimination section.

b) Related section:

Prices, rates, rentals.

17. The prices, rates and rentals demanded by any owner of a public service must be fair and reasonable.

List required.

Every owner of a public service shall supply the Board, before starting his operations and every time the Board requires him to do so, with the list of his prices, rates or rentals together with a copy of his classifications, regulations, contract forms and other documents of similar nature and all other information which the Board may require.

R. S. 1964, c. 229, s. 17.

7. New Brunswick Board of Commissioners of Public Utilities:

Public Utilities Act, Revised Statutes of New Brunswick 1973, c.P-27, as amended.

a) Anti-discrimination section:

6(1) Upon complaint made in writing to the Board that any rates, tolls, charges or schedules of any public utility are in any respect unreasonable, insufficient or unjustly discriminatory, or that any regulation, measurement, practice or act whatsoever affecting or relating to the operation of any public utility is in any respect unreasonable, insufficient or unjustly discriminatory, or that the service of any public utility is inadequate or unobtainable, or that any public utility should extend its services to any district without such services, the Board shall proceed, with or without notice, to make such investigation as it deems necessary or expedient, and may order such rates, tolls, charges or schedules reduced, modified or altered, and may make such other order as to the modification or change of such regulation, measurement, practice or act as the justice of the case may require, and may order, on such terms and subject to such conditions as are just, that the public utility furnish reasonably adequate service and facilities, and may order that the public utility shall extend its services to a district without such services, upon such terms and subject to such conditions as the Board may deem just

b) Related sections:

6(2) The Board has power of its own motion and without receiving any complaint in writing, to make any investigation as contemplated in subsection (1) and as a result of that investigation to make such ruling or order as it deems to be in the public interest.

6(3) In making an order under this section the Board shall take into consideration the reasonableness of the rate of return to the public utility upon its investment.

6(4) No such order shall be made without a public hearing or enquiry first had in respect thereto.

18(1) No person shall knowingly solicit, accept or receive any rebate, concession or discrimination in respect to any service in, or affecting or relating to, any public utility whereby any such service is by any device whatsoever rendered free or at a less rate than that named in the schedules in force as provided herein, or whereby any service or advantage is received other than is herein specified.

8. Nova Scotia Board of Commissioners of Public Utilities:

Public Utilities Act, Revised Statutes of Nova Scotia 1967, c.258, as amended.

a) Anti-discrimination sections:

Equality of service and charges.

63 (1) All tolls, rates and charges shall always, under substantially similar circumstances and conditions in respect of service of the same description, be charged equally to all persons and at the same rate, and the Board may by regulation declare what shall constitute substantially similar circumstances and conditions.

Unauthorized tolls.

(2) The taking of tolls, rates, and charges contrary to the provisions of this Section and the regulations made pursuant thereto is prohibited and declared unlawful. R. S., c. 243, s. 63.

Unjust discrimination.

102 If any public utility or any agent or officer thereof shall directly or indirectly, by any device whatsoever, or otherwise, charge, demand, collect or receive from any person, firm or corporation a greater or less compensation for any service rendered or to be rendered by it than that prescribed in the public schedules or tariffs then in force or established, as provided in this Act, or than it charges, demands, collects or receives from any other person, firm or corporation other than one conducting a like business for a like and contemporaneous service, such public utility shall be deemed guilty of unjust discrimination, which is hereby prohibited and declared unlawful, and upon conviction thereof shall be liable to a penalty of not less than fifty dollars for each offence; and such agent or officer so offending shall upon conviction thereof be liable to a penalty of not less than twenty-five dollars for each offence. R. S., c. 243, s. 102.

Undue preference.

103 (1) If any public utility shall knowingly or willfully make or give any undue or unreasonable preference or advantage to any particular person, firm or corporation, or shall subject any particular person, firm or corporation to any undue or unreasonable prejudice or disadvantage in any respect whatsoever, such public utility shall be deemed guilty of unjust discrimination, which is hereby prohibited and declared unlawful.

Penalty.

(2) Any person, firm or corporation violating the provisions of this Section shall on conviction thereof be liable to a penalty of not less than five dollars for each offence. R. S., c. 243, s. 103.

Rebates, concessions, etc., prohibited.

105 (1) It shall be unlawful for any person, firm or corporation knowingly to solicit, accept or receive any rebate, concession or discrimination in respect to any service in or affecting or relating to any public utility, or for any service in connection therewith, whereby any such service shall, by any device whatsoever or otherwise, be rendered free or at less rate than that named in the schedules and tariffs in force as provided in this Act, or whereby any service or advantage is received other than is in this Act specified.

Penalty.

(2) Any person, firm or corporation violating the provisions of this Section shall on conviction thereof be liable to a penalty of not less than twenty-five dollars for each offence. R. S., c. 243, s. 104.

b) Related sections:

Investigation

18 Whenever the Board shall believe that any rate or charge is unreasonable or unjustly discriminatory, or that any reasonable service is not supplied, or that an investigation of any matter relating to any public utility should for any reason be made, it may, on its own motion summarily investigate the same with or without notice. R. S., c. 243, s. 18.

Adequate service

48 Every public utility is required to furnish service and facilities reasonably safe and adequate and in all respects just and reasonable. R. S., c. 243, s. 48.

Where rates found unjust: powers of Board.

32 (1) If upon any investigation the rates, tolls, charges, or schedules, are found to be unjust, unreasonable, insufficient or unjustly discriminatory, or to be preferential or otherwise in violation of any of the provisions of this Act, the Board shall have power to cancel such rates, tolls, charges, or schedules, and declare null and void all contracts or agreements in writing or otherwise, to pay or touching the same, upon and after a day to be named by the Board, and to determine and by order fix, and order substituted therefor, such rate or rates, tolls or schedules as shall be just and reasonable.

Board may substitute regulations etc.

(2) If upon such investigation it shall be found that any regulation, time schedule, act or service complained of is unjust, unreasonable, insufficient, preferential, unjustly discriminatory or otherwise in violation of any of the provisions of this Act, or if it is found that reasonable service is not supplied the Board shall have power to determine and substitute therefor such other regulations, time schedules, service or acts and to make such order respecting and such changes in such regulations, time schedules, services or acts as shall be just and reasonable.

9. P.E.I. Public Utilities Commission:

Electronic Power and Telephone Act, Statutes of Prince Edward Island 1984, c.20, as amended.

a) Anti-discrimination section:

Powers of Commission relating to rates, tolls, etc.

29. (1) If, upon any investigation the rates, tolls, charges or schedules, whether fixed by or the subject of a signed contract or agreement or otherwise, are found to be unjust, unreasonable, insufficient or unjustly discriminatory, or to be preferential or otherwise in violation of this Act, the Commission may cancel the rates, tolls, charges or schedules, and declare void all contracts or agreements in writing or otherwise touching the same, and may determine and fix by order and order substituted therefor such other rates, tolls, charges and schedules as to the Commission may seem just and reasonable.

b) Related sections:

Complaints against public utility, investigation by Commission

27. (1) Upon a complaint made in writing to the Commission, against any public utility, by any municipal corporation or by any persons, firms or corporations, that any of the rates, tolls, charges, or schedules, whether fixed by or the subject of a signed contract or agreement or otherwise, are, in any respect, unreasonable or unjustly discriminatory, or that any regulation, measurement, practice or act affecting or relating to the transmission, delivery or furnishing of electric energy or the conveyance of telephone messages, or any service in connection therewith is, in any respect, unreasonable, insufficient or unjustly discriminatory or that the service is inadequate or unobtainable, the Commission shall make an investigation, and may order such rates, tolls, charges or schedules, modified or altered, and may make an order as to the modification or change of the regulation, measurement, practice or acts, and may order, on such terms and subject to such conditions as may seem just, that the public utility furnish reasonably adequate service and facilities, and make such alterations, extensions and additions as may be required; but before proceeding to make an investigation, the Commission shall require proof that a copy of the said complaint together with a notice of the time and place of such investigation has been served on the public utility at least fifteen days before the date fixed for the investigation, and, if the public utility is unable or unwilling to satisfy the complaint, it may within eight days after the service of the complaint file its answer with the Commission, and the public utility shall be given an opportunity of being heard and of adducing evidence at the investigation.

Summary investigation by Commission

28. (1) When the Commission believes that any of the grounds mentioned in section 27 exist for complaint by any person against any public utility, or that an investigation of any matter relating to any public utility should, for any reason, be made, it may, on its own motion, summarily investigate the same with or without notice.

Order permitting act by Commission after formal hearing

(c) If, upon any investigation under this section the Commission finds that any regulation or act, or any service to any customer of a public utility is unjust, unreasonable, insufficient, preferential, unjustly discriminatory or unobtainable or contrary to this Act, or if it finds that adequate service is not being supplied by such public utility to such customer, the Commission may determine and order substituted therefor such other regulations or service as it may deem just and reasonable; and may order that service to such customer be supplied by another public utility.

10. Newfoundland Board of Commissioners of Public Utilities:

Public Utilities Act, Revised Statutes of Newfoundland 1970, c.322, as amended.

a) Anti-discrimination sections:

Equality of rates.

70.—(1) All tolls, rates and charges shall always, under substantially similar circumstances and conditions in respect of service of the same description, be charged equally to all persons and at the same rate, and the Board may by regulation declare what shall constitute substantially similar circumstances and conditions.

Penalty for unjust discrimination.

102. If any public utility or any agent or officer thereof directly or indirectly, by any device whatsoever, or otherwise, charges, demands, collects or receives from any person, firm or corporation a greater or less compensation for any service rendered or to be rendered by it than that prescribed in the public schedules or tariffs then in force or established, as provided in this Act, or than it charges, demands, collects or receives from any other person, firm or corporation other than one conducting a like business for a like and contemporaneous service, such public utility is deemed guilty of unjust discrimination, which is hereby prohibited and declared unlawful, and upon conviction thereof is liable to a penalty of not less than fifty dollars for each offence and such agent or officer so offending is upon conviction liable to a penalty of not less than twenty-five dollars for each offence.

Penalty for undue preference or prejudice.

104. If any public utility knowingly or wilfully makes or gives any undue or unreasonable preference or advantage to any particular person, firm or corporation, or subjects any particular person, firm or corporation to any undue or unreasonable prejudice or disadvantage in any respect whatsoever, the public utility is deemed guilty of unjust discrimination, which is hereby prohibited and declared unlawful and any person, firm or corporation violating the provisions of this section is on conviction liable to a penalty of not less than fifty dollars for each offence.

Penalty for soliciting or receiving rebate.

105.—(1) No person, firm or corporation shall knowingly solicit, accept or receive any rebate, concession or discrimination in respect of any service in or affecting or relating to any public utility, or for any service in connection therewith whereby any such service by any device whatsoever or otherwise is rendered free or at a less rate than that named in the schedules and traiffs in force as provided in this Act, or whereby any service or advantage is received other than in this Act specified.

(2) Any person, firm or corporation violating the provisions of this section shall on conviction thereof be liable to a penalty of not less than twenty-five dollars for each offence.

b) Related sections:

Adequate service to be furnished by public utility.

35.—(1) Every public utility shall furnish service and facilities reasonably safe and adequate and in all respects just and reasonable.

Investigation by Board.

79. Whenever the Board believes that any rate or charge is unreasonable or unjustly discriminatory, or that any reasonable service is not supplied, or that an investigation of any matter relating to any public utility should for any reason be made, it may, of its own motion, summarily investigate the same with or without notice.

Power and procedure of Board upon complaint made.

81.—(1) Upon a complaint made to the Board against any public utility by any incorporated municipal body or by any five persons, firms or corporations, that any of the rates, tolls, charges or schedules are in any respect unreasonable or unjustly discriminatory or that any regulation, measurement, practice or act whatsoever affecting or relating to the operation of any public utility is in any respect unreasonable, insufficient or unjustly discriminatory or that the service is inadequate or unobtainable, the Board shall proceed, with or without notice, to make such investigation as it deems necessary or expedient, and may order such rates, tolls, charges or schedules reduced, modified or altered, and make such other order as to the reduction, modification or change of such regulation, measurement, practice or acts as the justice of the case may require, and may order on such terms and subject to such conditions as are just that the public utility furnish reasonably adequate service and facilities and make such extensions as may be required, but no such order shall be made or entered by the Board without a public hearing or enquiry first had in respect thereof.

Powers of Board where rates found unjust.

84.—(1) If upon any investigation the rates, tolls, charges or schedules are found to be unjust, unreasonable, insufficient or unjustly discriminatory, or to be preferential or otherwise in violation of any of the provisions of this Act, the Board has power to cancel such rates, tolls, charges or schedules and declare null and void all contracts or agreements in writing or otherwise to pay or touching the same, upon and after a day to be named by the Board, and to determine and by order fix and order substituted therefor, such rate or rates, tolls or schedules as shall be just and reasonable.

(2) If upon such investigation it is found that any regulation, time schedule, act or service complained of is unjust, unreasonable, insufficient, preferential, unjustly discriminatory or otherwise in violation of any of the provisions of this Act, or if it is found that reasonable service is not supplied, the Board has power to determine and substitute therefor such other regulations, time schedules, service or acts and to make such order respecting and such changes in such regulations, time schedules, service or acts as shall be just and reasonable, and upon any investigation for the purpose of determining upon and requiring any reasonable extension or extensions of lines, or of service, the Board has power to fix, determine, and require every such extension or extensions to be made and the terms and conditions upon which the same shall be made, but no hearing shall be held and no order shall be made respecting such extension or extensions, without notice to the public utility affected thereby as provided in this Act.

11. Canadian Radio-television and Telecommunications Commission: Railway Act, Revised Statutes of Canada 1970, c.R-2, as amended.

Traffic, Tolls and Tariffs

Tolls to be just and reasonable

321. (1) All tolls shall be just and reasonable and shall always, under substantially similar circumstances and conditions with respect to all traffic of the same description carried over the same route, be charged equally to all persons at the same rate.

No unjust discrimination

"(2) A company shall not, in respect of tolls or any services or facilities provided by the company as a telegraph or telephone company,"

(*a*) make any unjust discrimination against any person or company;

(*b*) make or give any undue or unreasonable preference or advantage to or in favour of any particular person or company or any particular description of traffic, in any respect whatever; or

(*c*) subject any particular person or company or any particular description of traffic to any undue or unreasonable prejudice or disadvantage, in any respect whatever;

and where it is shown that the company makes any discrimination or gives any preference or advantage, the burden of proving that the discrimination is not unjust or that the preference is not undue or unreasonable lies upon the company.

Commission may determine

(3) The Commission may determine, as questions of fact, whether or not traffic is or has been carried under substantially similar circumstances and conditions, and whether there has, in any case, been unjust discrimination, or undue or unreasonable preference or advantage, or prejudice or disadvantage, within the meaning of this section, or whether in any case the company has or has not complied with the provisions of this section or section 320.

Power of Commission to suspend, postpone and disallow tolls

(4) The Commission may

(*a*) suspend or postpone any tariff of tolls or any portion thereof that in its opinion may be contrary to section 320 or this section; and

(*b*) disallow any tariff of tolls or any portion thereof that it considers to be contrary to section 320 or this section and require the company to substitute a tariff satisfactory to the Commission in lieu thereof or prescribe other tolls in lieu of any tolls so disallowed.

General powers of Commission

(5) In all other matters not expressly provided for in this section the Commission may make orders with respect to all matters relating to traffic, tolls and tariffs or any of them.

Definition of expressions

(6) In this section and section 322, the expressions "company", "Special Act", "toll" and "traffic" have the meanings assigned to them by section 320. 1966-67, c. 69, s. 68.

CHAPTER 11

Effects of Changing Telecommunications Technology on Present and Alternative Local and Long-Distance Rate Structures

CHAPTER 11

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11.1 Background

The pace of technological innovation in telecommunications over the past few decades has been breath-taking, and changes are being introduced at an ever increasing rate. A brief resumé of this progress is given in Appendix A to this chapter. It is drawn from papers by I. Dorros and Th. Irmer presented at the Networks Conference held in June 1986.[1]

The costs of hardware have dropped enormously over this period, while performance has risen. In addition, for selected major telephone companies digital technology is rapidly replacing older transmission and switching technologies, as Table 11.1 shows.

TABLE 11.1
Conversion to Digital Technology
(Estimated % of Facilities Converted)

	B.C. Tel		Bell		NBTel	
Year	1985	1986	1985	1986	1985	1986
Type						
Long-Distance Switching	76.0	100.0	63.0	88.0	45.0	100.0
Local Exchange Switching	33.0	70.0	18.0	42.0	15.0	40.0
Inter-toll Transmission	N/A	N/A	60.0	74.0	46.0	33.0
Local Inter-office Transmission	N/A	N/A	56.0	75.0	N/A	75-85.0

Important software developments have accompanied the transfer to digital technology, providing new network features and improved control. In fact, the costs of software are becoming dominant in the development of new systems. For some manufacturers, they are even becoming prohibitive, as has

been demonstrated by the recent decision of ITT to stop the adaptation of their System 12 switch for the North American market.

Indeed, hardware is no longer a limiting factor in system development. Today, the hardware exists to provide dramatically superior performance at greatly reduced cost. The real barriers to change now lie in the requirement to provide an orderly evolution from existing plant, which has a significant net capital cost still to be recovered, and the need to develop new operations and maintenance systems.

The major technological developments in telecommunications principally affect the network itself. Access to the network is provided through outside (copper) plant which has exhibited little essential change. There has been some upgrading and rationalization of the distribution system, but nothing that will provide major hardware cost reductions.

A traditional "rule of thumb" is that approximately one-third of the costs of the basic telecommunications infrastructure lie in access plant. These costs have been largely recovered from ordinary local and long-distance rates. Thus, the fact that access technology is only changing slowly means that there is a significant portion of costs recovered by these rates that will not vary appreciably in the near future.

11.2 Historical Rating Principles

In the early days of telephony, local rates covered the costs of both access and the local network. Long-distance rates were set to recover the costs of joining local networks together. (At the time, interconnection was relatively expensive.) Over the years, however, network costs have fallen dramatically. Still, there has been some reluctance by telephone companies to alter the relationship between long-distance and local rates in any major way. The original relationship between local and long-distance rates and their corresponding costs consequently has been lost.

Another rating principle that has been employed is cost averaging. Rates are set to reflect average prices for the provision of service throughout the operating territory of the telephone company. There are, of course, some economies of scale in carrying traffic and, as a result, heavily used routes may actually be cheaper (per unit of traffic) than lightly used ones.

Finally, value-of-service pricing has been employed in setting local telephone rates. This means that business rates have been set at higher levels than residence rates for local service. Additionally, both business and residence rates increase with the number of subscribers in the local exchange area. This inverts the usual cost dependence relationship.

11.3 Effects of Future Technological Innovations on the Costs of Providing Service

Pressures for or against changes in telecommunications pricing may either increase or decrease depending on the evolving cost structure for the various services. The following information on this issue was provided by Bell Canada and British Columbia Telephone in response to questions raised in the course of this examination. For instance, regarding technological change, Bell has indicated as follows:

> The pursuit of new technology has resulted in the introduction of digital systems which provide economies... These technologies are affecting both the local and the toll portions of the network. However, the application of these technologies provides a more significant opportunity for cost reduction in toll rather than the local network because they offer a greater opportunity for concentration in the upper part of the network hierarchy.[2]

B.C. Tel also sees new technologies as having a greater impact on long-distance than on local costs. It has stated:

> Access costs consitute a major portion of local service costs, and the wide distribution of subscriber locations offer less opportunity for exploitation of economies of scale when compared with the toll network which has a greater portion of its costs in more concentrated areas such as intercity facilities with greater opportunities to exploit economies of scale. Secondly, the growth of toll traffic has been greater than local traffic, hence offering earlier opportunities for the economic introduction of new facilities.[3]

These statements substantiate the earlier observation that cost reductions will apply principally to the long-distance network. Other comments could be made with regard to specific technologies and costs, and how they are related. For example, the costs of fibre optics are decreasing to the point where satellites may no longer be competitive for heavy route point-to-point applications. Satellites, however, will likely remain the technology of choice for thin route (low-density) traffic in remote locations where there is a mobile endpoint, and for broadcast traffic. They may also gain some specialized niche markets. The point to note here is that satellite costs will not be dominant in providing telecommunications service; rather, fibre optic costs will likely dominate. Of course, cost differentials will ultimately determine the choice of technology to be used for particular applications. A more detailed review of how technological change could affect the provision of services is given in Appendix B.

Changes in technology may also give rise to changing traffic patterns on the network. For instance, the proliferation of personal computers may spawn calls to databases that have long holding times. In contrast, automated calls for credit verification, on the other hand, have very short holding times. The demand associated with such applications may require network reinforcement, thus creating an upward pressure on rates.

Furthermore, technological change may fundamentally alter network design methods. Historically, capacity (bandwidth) has been extremely expensive and network optimization techniques have consequently centred on minimizing the capacity required to carry the anticipated traffic load (and at the same time support near-term growth). In the future, bandwidth may diminish in importance because of a relative price decrease. This, in turn, could change the relative costs of different network parts. In fact, it might result in network designs in which the distinction between local and long-distance becomes increasingly blurred (except perhaps for tariff purposes).

A major technological drive at present (and probably over the next decade or so) is towards providing a larger variety of services -- particularly those characterized as "data" services -- using a family of globally acceptable standards. These new services will only indirectly affect the costs associated with the provision of ordinary telephone services to the extent that they complicate switch processing software and utilize network capacity. However, they could also affect equipment prices (and thereby telephone company costs) to

a greater extent, depending on the degree to which development costs are reflected in equipment prices (especially if software is provided on a bundled basis).

A point implicit in the above discussion deserves some elaboration. Between the costs of new technology and the rates charged subscribers, there are two levels of price setting: the price of the product received from the manufacturer (telephone company cost) and the rate charged for using it. While competitive pressures do tend to ensure that equipment prices reflect underlying costs, manufacturers can allocate development costs, within limits, in different ways among their products. Moreover, telephone company costs include the depreciation costs of embedded technology, and these are usually amortized over a relatively long period.

11.4 Impact of Rate Structures on Telephone Company Investment Decisions

A number of telephone companies have indicated that their investment decisions are based on demand projections rather than rate structures.[4] Bell Canada, however, notes a linkage between the two:

> Investment decisions for local and toll services are based, for the most part, on the existing and projected levels of demand for these services. The demand levels are, in turn, related to the existing and projected rate structures and rate levels. Therefore, local/toll rate structures affect investment decisions only in the sense that they play a role in determining the demand.

With respect to its investment decisions, B.C. Tel has stated as follows:

> B.C. Tel's fundamental position on investment decisions to provide for basic local and toll services is that these decisions are made independent of local/toll rate structures... these investments are primarily determined by demands for growth and movement, and the engineering parameters used to size the equipment additions do not depend on the rate structure.

Similarly, SaskTel states that its local investment decisions are based on modernization and growth objectives:

> Local investment decisions have been made based on modernization and service improvement (while)... toll investment decisions to date have been based on increased demand for future services and on modernization.

MT&T also supports the view that rate structures do not affect plant investment decisions. Rather, according to MT&T, investment decisions are primarily determined by age of plant, maintenance costs, costs of new technology, capacity and the like.

11.5 Relationship Between Customer Expectations and Investment in Local Facilities

As advances in technology accelerate and microelectronics continue to reduce the price of electronic components, consumer demand for more sophisticated services will likely continue to grow. The consumer may thus be expected to become increasingly more discriminating and more demanding.

In a discussion paper on the effects of introducing new technology, Manitoba Telephone System has stated the following:

> Over time, customers demand more and better services than can be supplied using existing technologies. Throughout North America, especially, telecommunications users, particularly in the business community, are using networks more and demanding new applications. This requires that telecommunications [companies] adapt and expand their networks for growth and flexibility.
>
> As customers use telecommunications networks to meet their expanding needs, they also demand higher levels of quality and performance. They expect them to be ever more responsive, reliable and dependable. As the industry in general responds to these demands, new standards for network facilities are established, to which individual companies, like [Manitoba Telephone System] which are integrated with national and international networks, must conform.
>
> As customer demands and needs grow and change, new burdens are placed on administrative structures. New technology is adopted to simplify and streamline administrative procedures and practices, resulting in improved service at lower costs.[5]

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ENDNOTES

1. Dorros, Irwin, "Evolution for the Information Age - The Challenge to Network Planning," Conference Record, Third International Network Planning Symposuim (Networks 86), 1-6 June 1986, Innisbrook, Tarpon Springs, Florida: pp.1-4; and Th. Irmer, "International Networking Trends," Ibid: pp.6-11. (Available from IEEE Communications Society, Piscataway, NJ.)

2. Bell Canada, Response to information request Bell(CRTC)19Feb86-41FP, Federal/Provincial Examination of Telecommunications Pricing and Universality.

3. British Columbia Telephone Company, response to information request BCT(CRTC)19Feb86-41FP, Federal/Provincial Examination of Telecommunications Pricing and Universality.

4. Telephone company responses to information request (CRTC)19Feb86-42FP, Federal/Provincial Examination of Telecommunications Pricing and Universality.

5. Manitoba Telephone System, "MTS and The Introduction of New Technology." Discussion paper submitted in response to information request MTS(CRTC)19Feb86-41FP, Federal/Provincial Examination of Telecommunications Pricing and Universality: p.1-2.

CHAPTER 11

Appendices

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APPENDIX A

Post-War Developments in Technology

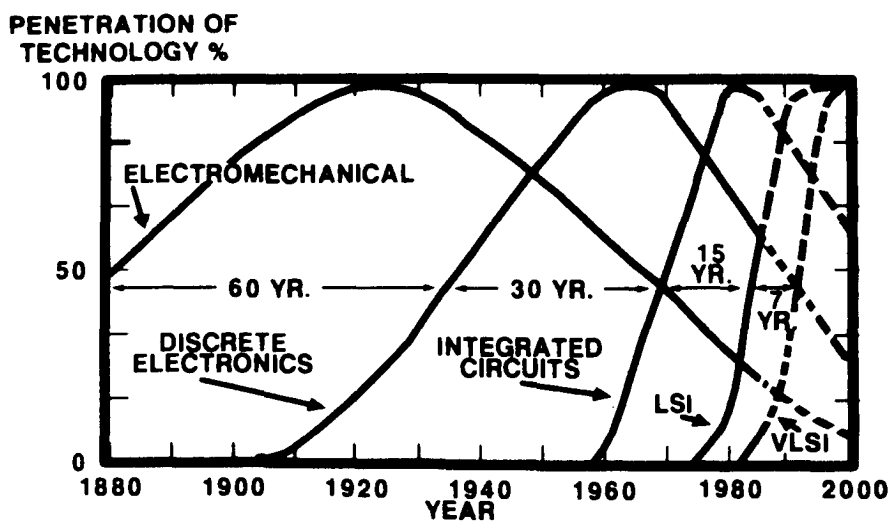
Hardware Developments

Starting from the invention of the transistor in 1947, the progress in information technology has been dramatic. This technology explosion, launching the Information Age, is changing the telecommunications and computer landscape. The transistor led to the integrated circuit and microelectronics which have revolutionzed the processing and switching of information signals. Then came optics or photonics, the laser and the optical fibre, revolutionizing the transmission of these signals. And, increasingly, the operation of sophisticated microelectronic and photonic systems is orchestrated by that all-pervasive agency, software -- the language of informatics.

These advances in technology have blurred the traditional boundaries between switching, inter-office and loop technologies. Integration of the network components and the supporting disciplines are the key issues in telecommunications network design today.

For electronic components, the time between substantial deployment of each succeeding generation of devices -- discrete electronics, integrated circuits, large scale integration (LSI) and very large scale integration (VLSI) -- has been dropping by a factor of two with each new generation, as illustrated in Figure A.1. Physical wearing out is no longer relevant. It has been replaced by technological obsolescence. Furthermore, each generation brings more capabilities with a lower cost per unit of capability. Thus, perfectly good network components and systems will be retired although they still function well. It is their lack of needed functional capability or features that makes them obsolete. As digital services grow, for instance, even the relatively modern stored-program control analogue switching machines will be retired.

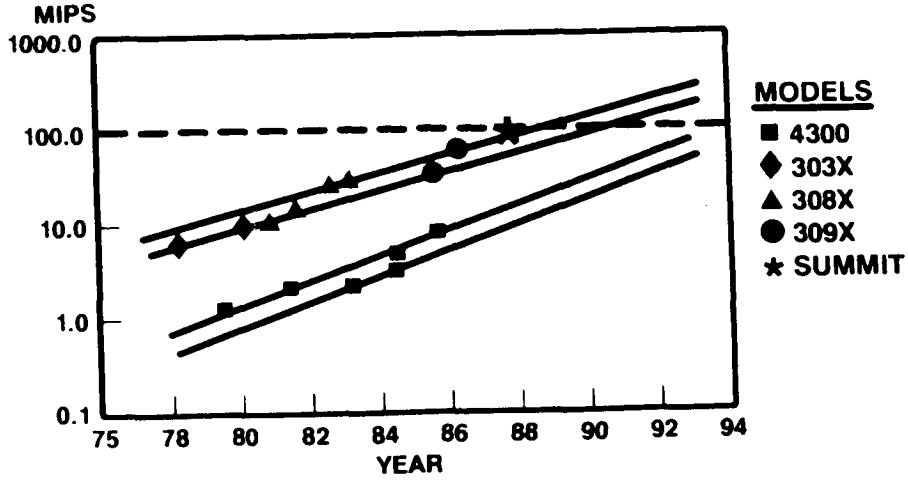
FIGURE A.1
Explosion in Component Technology



SOURCE: J.M. CONNELL, SPRING COMPCON 1981 (UPDATED)

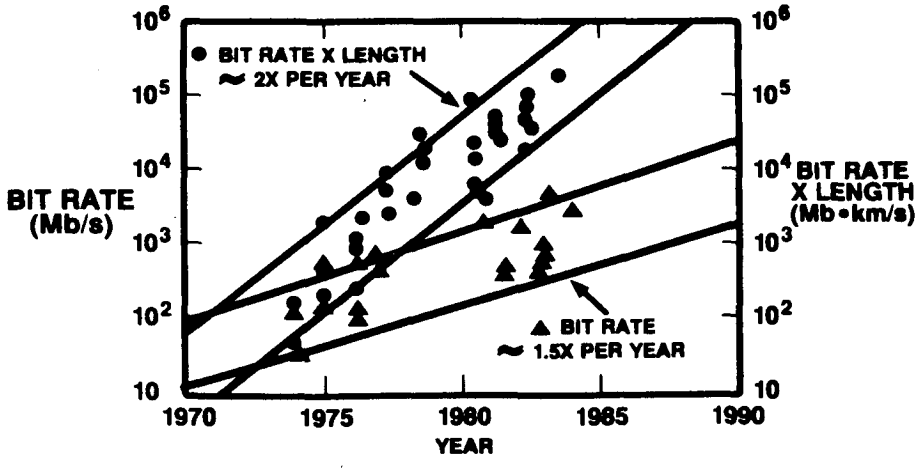
The introduction of new communications technology has also resulted in exponential performance increases in entire systems, as indicated by Figure A.2, which illustrates the capacity increase in MIPS (million instructions per second) for IBM mainframe computers. Similar trends apply to the specialized telecommunication computers known as digital switching systems.

FIGURE A.2
Trends in Computer Processing Speed



The technology explosion has similarly affected fibre technology, which is also evolving rapidly. Both the bit rates carried on fibre and the distance between repeaters have been increasing substantially, as Figure A.3 illustrates, making fibre the transmission medium of choice for inter-office and many loop transport applications.

FIGURE A.3
Progress in Performance of Lightwave Technology



The Digital Network

In 1938, a patent was granted to Alec Reeves, a British engineer, describing all the principles of so-called "pulse code modulation" (PCM) -- i.e. the conversion of an analogue telephone signal into a digital signal. It very precisely described the processes of sampling, quantizing and encoding in exactly the same way that they are being applied today in modern digital equipment.

Despite the ideas embodied in this patent, however, the time had not come to put digital technology into practical use. To perform sampling, quantizing and coding, Reeves needed a tremendous number of components (tubes, capacitors, resistors, etc.). At the time, technology was not able to convert analogue to digital signals economically.

This situation changed dramatically with the invention of the transistor and the subsequent technological revolution. Modern technology performs all these functions at very low cost. The evolution of digital technology in telephony started at the same time that semi-conductor technology permitted the cost-efficient design of digital systems using PCM.

Since the beginning of this evolution, we have seen a breath-taking development of digital systems, seemingly with no end in sight. All these developments, however, rely on two determining factors: technology and economy. These are inter-related and mutually dependent. What this means in practice is discussed in greater detail below.

Modern digital technology provides many new features. Among them are network features such as new signalling systems that also provide network management and operational functions. Digital technology also offers new customer features implemented either in digital switching systems or in terminals. The old, simple telephone for talking and listening has been adapted to incorporate new features, upgrading the telephone to a true communication terminal.

Modern technology has increased the general performance of telecommunication networks. The performance of the existing analogue networks can be substantially improved by applying digital technology. It also permits the transfer of digital information at much higher rates.

With respect to economy, there are two important items: investment costs and operational costs. As far as investment is concerned, modern digital hardware is becoming relatively inexpensive due to decreasing costs for components. The same effect can be observed in the dramatic drop in prices for many electronic consumer products.

However, reduced component costs are not the only contributing factor to lower total costs. A modern digital network requires less equipment than an analogue network because of the direct interconnection of the transmission link with a digital exchange at a higher level than the individual circuit, thus avoiding the need for multiplexing or demultiplexing equipment. In an analogue network, interconnection always had to be at the level of the analogue telephone channel, requiring analogue multiplexing and demultiplexing equipment at each exchange.

As a result, substantial savings in digital networks can be expected from both lower investment costs and less equipment. Operational costs will also drop in comparison with existing networks. Modern digital systems have built-in monitoring and supervision functions that can be operated from central maintenance and operation centres covering extensive areas and at lower

operational costs. Because of the permanent supervision built into digital systems, faults can be detected early and appropriate remedial measures taken before a major problem results. Another factor contributing to low operational costs flows from the high reliability of digital systems.

Switching and transmission are the two main elements of a telecommunications network. With the provision of both digital transmission and switching equipment which is reliable, economic and uses advanced technology, the transition from the analogue to digital networks began. This transition is one of the most complex tasks ever to be carried out by telecommunication experts and it is still continuing. The next proposed step is the evolution from the digital network to an integrated services digital network (ISDN). That is, in addition to the technical, operational and economic advantages offered by a digital telephone network, another feature, the "integration of services", is being considered.

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APPENDIX B

Technological Trends and Impacts

Integrated Services Digital Network

The continued deployment of digital technology into the network is expected to lead, ultimately, to the concept of the ISDN. With the ISDN, a common network access point will be available for all types of services -- including voice, data and image for both residence and business subscribers.

The ISDN is expected to provide many benefits for consumers, including access to a host of new information services. It also should provide greater flexibility and more control over communications costs, particularly in private-line services where circuits and services will be configured on a software basis rather than by physical arrangements and configuration as is done today.

Common Channel Signalling

Closely related to ISDN, common channel signalling (CCS) involves the use of a signalling system that is functionally separate from the existing network. CCS is more efficient than conventional signalling systems, allowing carriers more cost control. It also facilitates the introduction of new services.

The opportunity to reduce costs associated with CCS are, as with digital technology, more significant in the long-distance than the local network. However, CCS may provide services such as calling party identification that could be new sources of revenue.

Mobile Communication Systems

One of the most recent developments related to mobile communications technology has been the development of cellular mobile radio telephones. With cellular telephones, low-power transmitters are used to serve small geographic areas called "cells". The use of the cell concept allows frequencies to be reused in non-adjacent cells. Consequently, the cellular system provides benefits such as increased capacity, more effective use of the radio spectrum and improved quality when compared to existing mobile systems.

The effects of cellular technology on telecommunications rate levels and rate structures are dependent upon factors such as costs and applications. At the present time, the initial costs of the cellular telephone along with monthly service charges are relatively expensive when compared to the rates charged by the telephone companies for primary exchange service. The cellular market is, therefore, currently more attractive to highly mobile customers than to the majority of telephone subscribers.

Very significant reductions in the costs of the cellular telephone, coupled with size reductions, could result in a mass migration to cellular service. This could result in an erosion of telephone company revenues leading to rate increases for subscribers who remain on the public network.

Another development related to mobile communication systems is the mobile satellite (MSAT). Although neither currently fully developed nor proved to be economical, MSAT perhaps could provide an alternative method of basic telephone service to subscribers in remote locations.

Office Network Communications

Two major types of systems used in offices are private branch exchanges (PBXs) and local area networks (LANs). PBXs are telephone switches designed to be located on the business customer's premises. They provide access to public and private networks for off-premises calls and switch on-premises calls by themselves. LANs are designed to provide data communications within a building or group of buildings among various types of equipment such as personal computers, printers and word processors.

The current trend in office products development is the greater integration of voice, data and image communications, and the addition of new features. PBX innovations such as call detail recording and least cost routing features provide users with greater control of telecommunication costs.

Network Administration and Control Systems

Trends are for carriers to deploy mechanized (computerized) administration, maintenance and control systems in the network. These systems provide opportunities for reductions in operating costs and promote a more efficient use of the network. Future enhancements to such systems are likely to include artificial intelligence (expert systems) for further cost benefits.

Community Antenna Television

Current trends are towards the development of new services, service enhancements and new applications. Examples include teleshopping, pay per view television and directory services.

The effect of community antenna television (CATV) on local and long-distance rate structures are expected to be minimal over the near term due to CATV's general lack of two-way capability. Over the long term, however, CATV could be used as a transmission medium for providing services in competition with telephone company services.