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

REPORT

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Federal/Provincial
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To Ministers Responsible for Communications,

Nine months ago, Canada's Ministers responsible for Communications asked a group of federal and provincial regulators and officials to initiate an examination of pricing and universality. The Terms of Reference provided by Ministers indicated that they sought to develop a common base of information that they could then use to address policy issues relating to these matters. I was honoured to be called upon to chair and co-ordinate the examination.

On behalf of all the participants, I am now pleased and proud to report to the Ministers the results of our collective work. The present report, together with attached working papers, analyses current rating practices and principles, identifies a range of possible alternative rating structures, and considers their advantages and disadvantages in terms of a number of factors set out in the Terms of Reference. The information provided should enable Ministers to better assess the current situation together with the impacts of a number of possible changes thereto in relation to the common objectives that they agreed to at their February 1986 Ministerial Conference.

Furthermore, the positive contribution of each of the participants and the stimulating interactions that have taken place have shown the real possibilities of fruitful federal/provincial endeavours in a matter as historically difficult as the study of telecommunications issues. No one participant could have authored the present report; it is instead the result of a collective effort in which serious consideration of all views was given. That agreement was reached on so many issues is, in my view, an encouraging sign for the future.

Finally, I would like to acknowledge the substantial assistance provided to members of the examination by the staff assigned to the project, including Mr. Angus Oliver, Staff Co-ordinator and Mr. Tom Grandy, Report Secretary. To all I wish to express my sincere gratitude.

Trusting that Ministers will find that this report adequately responds to the Terms of Reference and will assist in deliberations on the future of the Canadian telecommunications industry, I remain,

Yours very truly,

Jean-Pierre Mongeau.

Jean-Pierre Mongeau
CRTC Commissioner
Examination Chairman

EXECUTIVE SUMMARY

This report presents the results of an examination of telecommunications pricing and the universal availability of affordable telephone service conducted by federal and provincial regulators and officials at the request of Canada's Ministers responsible for Communications. The report responds to a request by Ministers for information which can be used to address issues relating to the pricing of telecommunications services.

The report notes that Canada has developed a technically advanced, high quality, widely available telecommunications system offering a broad range of services to Canadians.

The report proceeds with a discussion of current telecommunications rating principles and practices, and the identification and analysis of possible alternative rating structures. The advantages and disadvantages of current rating principles and practices and the impacts of alternative rating structures are discussed in terms of five criteria presented in the Terms of Reference for the examination:

- 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.

In addition, various measures are identified to alleviate the potential adverse effects of current and alternative pricing systems.

In its examination of current telecommunications pricing, the report notes that whereas similar rating principles and practices have been adopted across Canada, rate levels for local and intra-company long-distance telephone services vary considerably from company to company.

Rates for inter-company long-distance services, with some exceptions, are quite similar.

As noted above, the report identifies and analyses alternative rating structures. Impacts on local telephone service rate levels are estimated, based on a number of assumptions, for each province as a consequence of changes to long-distance rates. For example, lowering inter- and intra-provincial long-distance rates across the country by 10 per cent would result in residential local rate increases ranging from 10.5 per cent to 22.4 per cent, depending on the province. This would constitute actual dollar increases ranging from $1.15 to $2.13 per month. Alternatively, lowering inter-provincial rates by 50 per cent and intra-provincial rates by 20 per cent would result in local rate increases ranging from 44.5 per cent to 108.5 per cent and actual dollar increases ranging from $4.88 to $10.66. The same analysis has been carried out for local business rates.

An analysis of average monthly bills associated with the reductions in inter- and intra-provincial long-distance rates and the local rate increases discussed above predicts that average monthly residential bills would change very little from current average bills. Whereas the average residential bill in most provinces would remain largely unchanged, the majority of residential subscribers would experience some bill increases, except in Bell Canada territory. The distribution of effects is such that a small number of bills are predicted to decrease by comparatively large amounts and a larger number are predicted to increase by a small amount. For example, in the case of 10 per cent reductions to inter- and intra-provincial rates, the majority of bills are predicted to change by less than $5.00. Depending on the province, 4.2 per cent to 9.7 per cent of monthly bills are estimated to decrease by more than $5.00 and no bills are predicted to increase by more than $5.00. In the case of a 50 per cent reduction to inter-provincial long-distance rates and a 20 per cent reduction to intra-provincial rates, larger percentages of monthly bills are predicted to decrease or increase by more than $5.00. Estimated decreases in a small number of bills could be greater than $100.00 per month; alternatively, no bills in any province are predicted to increase by more than $15.00 per month.

The analysis of average monthly bills also predicts that business customers generally would experience reduced average bills. This would not, however, be the case in all provinces or for all types of customers.

The report investigates rate restructuring within both local and long-distance services. Alternatives outlined include: for local services,

compressing the number of rate groups, reducing or eliminating residence/business rate differentials, creating a separate rate for access, introducing local measured service; and, for long-distance services, altering the distance dependence of rates, altering the rate relationship between substitutable services, changing existing or introducing new time-related discounts. It is noted that such rate restructuring alternatives may increase or decrease the effects on some subscribers of the long-distance/local rate changes discussed above.

Canada has one of the highest levels of telephone service penetration in the world - 98.2 per cent of Canadian households subscribed to telephone service in 1985. The report contends, based on the best evidence available to date, including a statistical model developed by staff, that increased local rates would be unlikely to result in significant reductions to telephone service penetration levels, even for price increases of as much as 100 per cent. This position differs markedly from previous statements made by a number of parties that penetration levels would be seriously affected.

The current extent of bypass of telecommunications carriers' facilities, both domestically and internationally, has been found to be minimal. Bypass is deterred by current pricing principles and practices as well as by the radio spectrum licensing, interconnection and other policies of the federal and provincial governments, and by Canada-US exchange rate differentials. Removal of some or all of these deterrents could result in increased bypass activities in Canada.

Available evidence indicates that telecommunications costs for Canadian businesses are on average a relatively small portion of the total costs of doing business. Furthermore, surveys of Canadian businesses indicate that most consider telecommunications costs to be relatively unimportant (a) in terms of Canada as a place to do business and (b) in terms of their international competitiveness. Hence, it is concluded that telecommunications rate changes would have only small impacts on the overall cost structure and performance of Canadian business, both in domestic as well as international terms. Many companies, however, devote much more of their purchased inputs to telecommunications services than the average. Information-intensive Canadian businesses or those competing directly with US counterparts having lower long-distance rates could be affected most by rate restructuring. Furthermore, while telecommunications services may not generally constitute a significant cost component of Canadian business, the availability of high quality, technologically-advanced telecommunications products and services is of importance.

The report includes an examination of the effects of current and alternative local and long-distance rates on fostering effective use of the public telecommunications network. More effective use could potentially be achieved by rating changes - for example, through time-related discounts - which redistribute telephone calling and, hence, the use of resources, from peak to off-peak periods. More effective use may also be fostered by the utilization of network capabilities, which might otherwise lie idle or not be developed, to provide new services to the public and new revenues for the industry.

The report reviews a number of differing approaches to the costing and pricing of telecommunications services relative to contributing to overall economic efficiency. The report also summarizes a number of studies which explore the macroeconomic impacts of telecommunications rate changes. 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.

Finally, the report outlines various measures to alleviate the potential adverse effects of current and alternative rating principles and practices. Alternative measures to maintain or improve the availability of affordable telephone service include lifeline services, government assistance to individuals or to telephone companies and budget services. Rating changes to promote economic efficiency and the user-pay concept in rate structures are also discussed.

PREFACE

This report contains the results of an examination of telecommunications pricing and universality conducted by federal and provincial regulators and, in some cases, government officials. For regulators in particular, participating in the examination provided a unique opportunity to work with fellow regulators from other parts of the country and to increase their understanding of the issues each faces. The report reflects the atmosphere of mutual respect and co-operation that was present throughout the examination.

TABLE OF CONTENTS

1.0 INTRODUCTION

This report presents the results of an examination of telecommunications pricing and the universal availability of affordable telephone service conducted by federal and provincial regulators and officials at the request of Canada's Ministers responsible for Communications. The report responds to a request by Ministers for information which can be used to address issues relating to the pricing of telecommunications services.

1.1 Terms of reference

Ministers requested that a report be prepared for their consideration which:

a) Analyses current rating practices and principles used to establish the price to the consumer of telecommunications 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 Organization and functioning of the examination

From its inception in early 1986, the examination proceeded 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. The examination was chaired by Canadian Radio-television and Telecommunications Commissioner, Jean-Pierre Mongeau. Other members of the examination are presented in Appendix A.

At the outset, three Working Groups composed of members of the examination and supported by their respective staff members were established to gather and analyse information pertaining to three key areas, respectively: local rating principles and practices, long-distance rating principles and practices, and the inter-relationships between the two. The Working Papers of the examination are contained in a separate volume which forms the basis of the current report. A list of Working Paper chapter titles is contained in Appendix B.

In all activities pertaining to the examination, members confined their activities to the collection and review of information and the provision of objective analysis relating to existing pricing arrangements and possible alternatives. In this respect, members considered their role to be an analytical and advisory one that 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 The environmental context of the examination

1.3.1 The historical environment

Until recently, Canadian telephone companies have operated within a relatively stable telecommunications policy and regulatory environment. Telephone companies have been virtual monopoly providers of telephone service in a largely non-competitive and regulated environment. A technically advanced, high quality, widely available telecommunications system offering a broad range of services to Canadians has been developed. Telephone companies, regulators and governments alike have subscribed to the objective of universal availability of affordable telephone service, and have developed pricing arrangements to make access to the network attractive. The result has been the development of a pricing system in which a company's total costs are recovered in the aggregate, but where the rates for individual services are not necessarily intended to recover related costs, and where rates are generally averaged on a company-wide basis. The

presence of such a pricing system has given rise to debate as to the existence of cross-subsidization on both a service and a geographical basis. Some parties hold the view that extensive cross-subsidization takes place, for example, from business to residence subscribers, from long-distance users to local service users and from urban subscribers to rural subscribers. Alternatively, there are those who argue that costs could be allocated in such a way as to show that cross-subsidization is less extensive than supposed and, in some cases, that the reverse may be true - for example, that local service users subsidize long-distance users. The debate as to the existence or direction of cross-subsidization has its roots in assumptions, about which there is no consensus, made regarding the costs of providing service.

1.3.2 Pressures to change or maintain the status quo

In recent years, significant change in the telecommunications environment has led to increased discussion regarding 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 as well as the pricing arrangements that have been adopted.

In general, the telecommunications industry has been a leader in adopting new technologies to improve productivity. Pricing policies, however, often have not explicitly recognized specific cost reduction measures resulting from technological change. There is consequently a perception that the prices for many services should be changed to reflect underlying costs more directly.

The technologies of telecommunications are no longer unique to nor entirely under the control and direction of the telecommunications companies. Reduced unit costs of telecommunications switching and transmission have expanded the potential for competitive entry into all aspects of the industry, from manufacturing to service provision.

The widespread availability of technology and the potential for lower prices also give rise to the possibility that users will avail themselves of alternatives provided by other than the regulated telecommunications companies to complete some or all of their telecommunications requirements, i.e. "bypass" the established telecommunications industry. Bypass, it is argued, could have a negative impact on the ability of the telephone companies to provide universally available telephone service at affordable rates.

Views differ on how best to respond to the pressures for price changes. Some believe that competition should be permitted in many more aspects of the industry and that prices ultimately should be determined by market forces. Others believe that price changes can be brought about by a managed restructuring of rates. Such restructuring, it is argued, would achieve the benefits of competition without incurring its disadvantages. Still others oppose any significant change to the status quo, indicating that present rating principles and practices and industry structure have served Canadians well and therefore should not be lightly discarded. Regulatory initiatives, it is contended, can be used to control competitive entry and to prohibit bypass, thus ensuring the financial integrity of the national telecommunications system.

The telephone industry largely supports the concept of a managed restructuring of rates. For instance, Bell Canada and the British Columbia Telephone Company supported by various other telephone companies, have argued that telecommunications service rates should be moved closer to their associated costs, in a process they have termed "rate rebalancing". As described by these two companies, rate rebalancing would result in lower rates for message toll service (MTS -the ordinary long-distance call) and wide area telephone service (WATS - a discounted form of MTS), and higher local rates. Net revenues would be maintained at existing levels. This matter arose in a proceeding before the Canadian Radio-television and Telecommunications Commission (CRTC) to consider a 1983 application by CNCP Telecommunications for interconnection to the networks of Bell Canada and B.C. Tel to enable CNCP to provide competitive public long-distance telephone service.

While the CRTC did not approve the CNCP application, nor was it persuaded that the specific rate rebalancing proposals presented by Bell Canada and B.C. Tel were either necessary or desirable. It did, however, state that in its opinion a lowering of Bell and B.C. Tel MTS/WATS rates was necessary. As an interim measure, the CRTC indicated its intention to freeze the aggregate level of Bell's and B.C. Tel's MTS/WATS rates. The position of the CRTC on this matter is not necessarily shared by other regulators.

Support for lower long-distance rates through increased competition or, in some cases, by rate restructuring as discussed above, has been expressed by some Canadian businesses either individually or through organized business groups. Lower long-distance rates, it is argued, would stimulate Canadian business generally and improve its ability to compete in international markets.

Some consumer groups have argued against any changes that would significantly alter the present pricing structure. In particular, they have argued against changes that would result in higher local rates. Such changes, in their view, could potentially threaten the universal availability of telephone service or result in hardship to some consumers.

In the United States, and now in certain other industrialized countries, a general move towards increased competition in economic activities has resulted in competitive entry into many areas of telecommunications. Competitive entry has been accompanied by a restructuring of rates to suit the new environmnent and, in many cases, by a lessening of regulatory control over rates.

The "demonstration effect" of the US experience has been considerable. The Canadian and US telecommunications 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. Still 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.

2.0 CURRENT TELECOMMUNICATIONS PRICING

2.1 Current rating principles and practices

Telephone companies across Canada follow similar rating principles and practices, and have adopted similar rate structures. Key objectives which are taken into account in rate setting include universal availability of basic telephone service, customer satisfaction, adequate and stable revenues, an equitable distribution of charges, effective use of the network and meeting competition. To achieve these objectives, telephone companies have developed two key rating principles which are unanimously subscribed to: company-wide rate averaging and value-of-service pricing.

Company-wide rate averaging means that rates for services with similar features are the same throughout a telephone company's operating territory, regardless of the type of terrain, location, technology employed, etc. For example, within a given exchange, all subscribers pay the same basic local service rate for a given class of service regardless of their usage or distance from the telephone company central office. As a further illustration, a customer in the Fraser Valley in B.C. Tel territory, where the cost of providing telephone service is relatively low, pays the same price for the same grade of service as a customer in a similar community in northern British Columbia, where the cost of providing the service is considerably higher.

In the case of long-distance services, company-wide rate averaging results in the rates for long-distance services being independent of route. For example, whereas underlying costs may vary considerably, a 100-mile call from Winnipeg is rated the same as a 100-mile call from Churchill. This particular aspect of company-wide rate averaging is termed "route averaging". All Canadian telephone companies presently use route-averaged rates for most long-distance services.

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 pricing is extensively applied in practice in the case of local services, where it forms the basis for rate group structures and for the difference between residence and business rates.

Applying these two principles has meant that rates for services do not necessarily reflect their costs, except in the aggregate. Some costs are taken into account in specific instances, however, by charging more for higher-cost services. Thus, operator-assisted long-distance calls, while route averaged, are priced higher than direct-dialed calls. Reduced charges for evening, night and weekend service reflect the low incremental cost of such calls, and the fact that such discounts can assist in increasing network utilization and help reduce peak traffic demand.

All telephone companies have adopted the practice of providing local service on a flat-rate basis. In Bell Canada, B.C. Tel, Maritime Telegraph and Telephone, and New Brunswick Telephone Company territories, however, local measured service (LMS) has been available to individual-line business customers located in large exchange areas, but is not widely used. Extended area service (EAS), available in varying degrees throughout the country, allows customers in neighbouring exchanges to call one another on a flat-rate basis without incurring long-distance charges.

Long-distance services are provided on a distance and usage-sensitive basis. All customers may avail themselves of discounts, generally offered during non-peak periods, in long-distance services. Customers with large long-distance requirements (i.e. certain business customers) may also achieve significant savings by leasing either WATS or private-line voice services.

Generally speaking, the rating objectives and principles described above pertain to the broad range of local and long-distance services provided by the telephone companies. The majority of services - e.g. most aspects of local service, MTS and WATS - are provided on a monopoly basis. Some, however, are provided competitively, such as data communications and private-line voice services. In the case of competitive services, pricing practices generally take into account competitors' pricing policies and levels, and recovering costs from those who use the services. Hence, while the key objectives and principles are the same, competitive pricing practices recognize that different conditions apply in a competitive as opposed to a monopoly environment.

2.2 Rate levels across Canada

Whereas similar rating principles, practices and rate structures have been adopted throughout Canada, considerable variation in rate levels occurs for both local and long-distance services. Such variation reflects, in part, different approaches to the implementation of rating principles and practices. For example, local rate levels are affected by the particular approach to EAS that has been adopted. Variations in rate levels also reflect the different conditions under which companies operate - for instance, varying geographic and demographic characteristics of the areas being served, differences in operating costs, public versus private ownership, differences in the mix of business versus residence customers, and variations in general economic conditions.

2.2.1 Local rate comparisons

Local telephone service rates vary considerably across Canada. To illustrate this point, residence and business rates are presented in two ways: first, rates in effect in selected cities are presented and, second, rates that would apply to an illustrative telephone exchange are compared for various companies across the country.

Table 1 presents the rates that were charged in December 1985 to residence and business customers in selected Canadian cities. Residence rates in these cities varied from a low of $7.50 per month in Winnipeg to a high of $13.15 in St. John's - almost twice as high. Similarly, business rates varied from a low of $20.00 per month in Winnipeg to a high of $41.00 in St. John's - this time more than twice as high. It should be noted in making such comparisons that different levels of availability of EAS in these cities makes direct one-for-one comparisons difficult.

Figure 1 compares local residence and business rates for an illustrative exchange of 21,300 local access lines without EAS. These results are thus somewhat different from those presented in Table 1. The lowest residence rate here is $6.30 per month for Manitoba Telephone System and the highest is $12.65 for MT&T - a factor of 2. As the figure also shows, business rates vary from a low of $14.15 per month for Manitoba Telephone System to a high of $38.80 for Island Tel - a factor of 2.7 higher. Both methods of comparison yield approximately the same ratio of residence to business rates, varying from 32 per cent to 46 per cent.

TABLE 1
Comparison of business and residence monthly local telephone rates in selected Canadian cities*

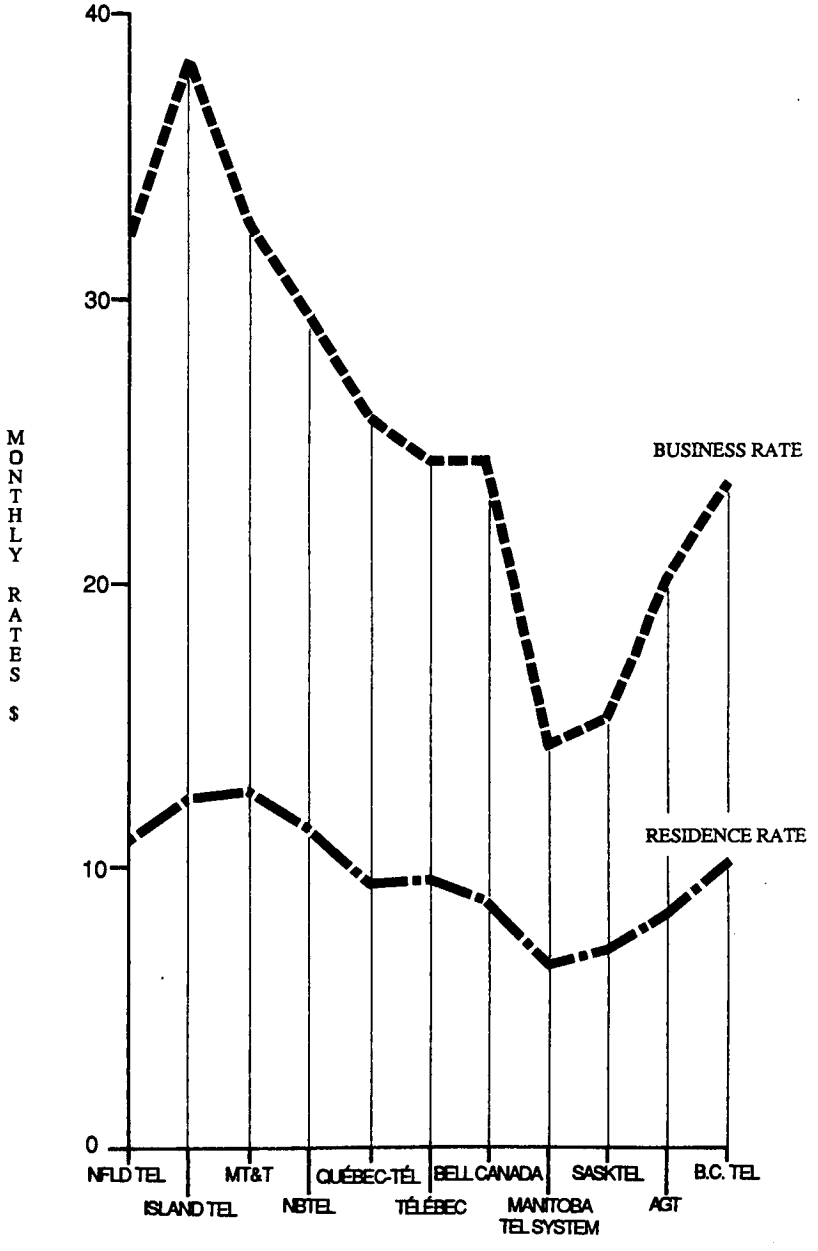
City (Company)	Monthly Residence Rate ($)	Monthly Business Rate ($)	Residence as % of Business
St. John's (Nfld Tel)	13.15	41.00	32
Charlottetown (Island Tel)	12.60	38.30	33
Halifax (MT&T)	13.10	37.50	35
Moncton (NBTel)	12.05	35.45	34
Rimouski (Qué-Tél)	12.80	38.85	33
Ottawa (Bell Canada)	10.70	34.45	31
Winnipeg (Manitoba Telephone System)	7.50	20.00	38
Regina (SaskTel)	8.30	20.85	40
Calgary (AGT)	9.28	23.74	39
Victoria (B.C. Tel)	11.70	31.85	37

* Includes rental of rotary-dial telephone set and, where applicable, EAS.

More extensive comparisons of the rates for particular cities and other sizes of exchanges are contained in Chapter 2 of the Working Papers.

In summary, although similar rating principles and practices have been adopted by telephone companies across the country, their translation into actual local telephone service rates by individual jurisdictions, together with differences in operating conditions and other factors, result in substantial differences from company to company.

FIGURE 1
Comparison of business and residence monthly local telephone rates - Illustrative exchange (without EAS) of 21,300 local access lines*



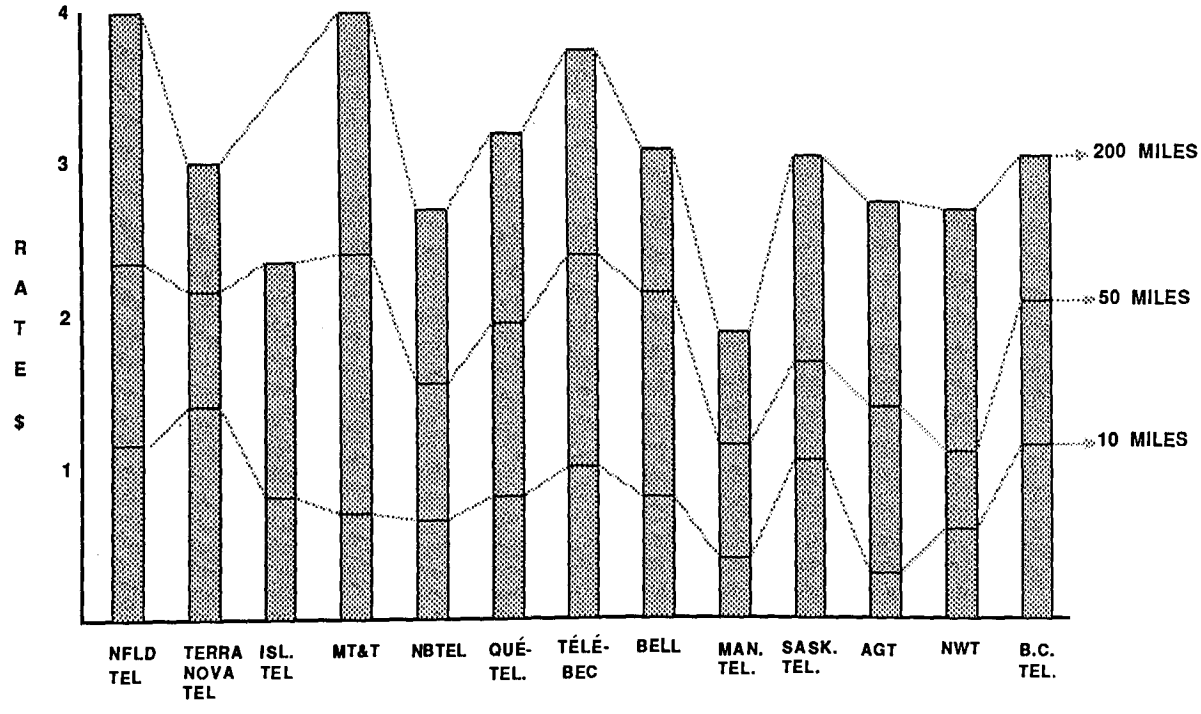
* Includes rental of rotary-dial telephone set.

2.2.2 Long-distance rate comparisons

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

Figure 2 presents a comparison of the rates for five-minute customer-dialed intra-company business day calls of 10, 50 and 200 miles for various telephone companies across the country. This equates to a comparison of the rates for an intra-provincial call for all companies

FIGURE 2
Intra-company long-distance rate comparison (December 1985)

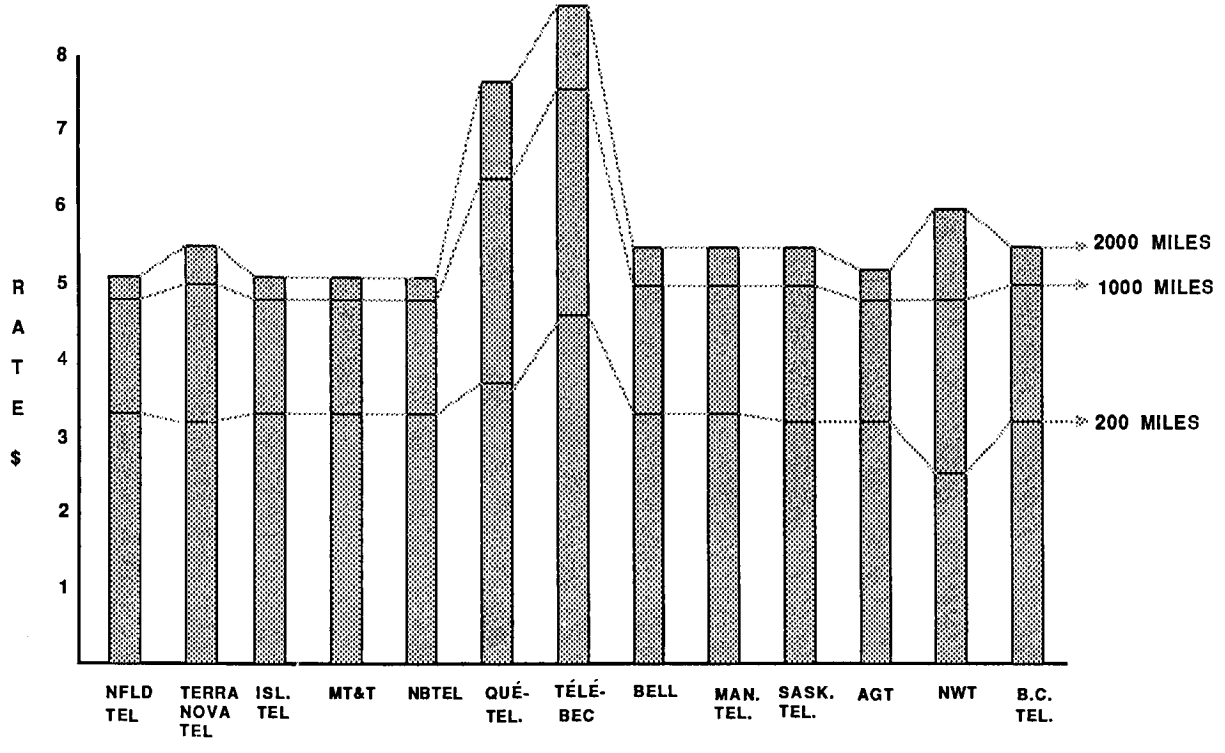


NOTE - Comparison based on five-minute customer-dialed call.

except Bell Canada, where intra-company calls can occur between locations in Ontario and Quebec. As can be seen from this figure, there are wide variations in intra-company long-distance rates among the companies. For example, a 200-mile call varies from a low of approximately $2.00 for subscribers of Manitoba Telephone System to a high of approximately $4.00 for subscribers of Newfoundland Tel and MT&T.

Figure 3 presents a comparison of the rates for five-minute customer-dialed inter-company business day calls of 200, 1,000 and 2,000 miles. With some exceptions, the rates for such calls are quite similar.

FIGURE 3
Inter-company long-distance rate comparison (December 1985)



NOTE - Comparison based on five-minute customer-dialed call.

More extensive comparisons of long-distance rates are included in Chapter 2 of the Working Papers.

3.0 ALTERNATIVE RATE LEVELS AND STRUCTURES

Should consideration be given to changing telecommunications rates, this chapter examines how rates for telecommunications services could be restructured. The specific alternatives considered respond to the pressures outlined earlier. Section 3.1 examines the process of changing long-distance rate levels with consequent adjustments to local rates to maintain net revenues - primarily a process of counter-balancing rate changes. Section 3.2 examines the effects that such rate level changes would have on average customer bills. Section 3.3 then considers a variety of structural changes to rates which could fundamentally alter the pricing of both local and long-distance services.

3.1 Alternative long-distance/local rate levels

In order to estimate the impact of changed long-distance rates on local rates, a study was commissioned from Peat, Marwick and Partners. It used a financial model of the nine Telecom Canada telephone companies developed previously by Peat Marwick and refined for current purposes.

In the modelling exercise, a number of scenarios involving increases and decreases in long-distance rates were studied. A 1986 test year was used for most scenarios, but for certain scenarios anticipated effects were projected to 1990. For each individual scenario, the net revenue impact associated with changed long-distance rates was determined. Adjustments to local rates that would be necessary for each telephone company to maintain its financial position were subsequently calculated. It was assumed that the existing Telecom Canada Revenue Settlement Plan would remain unchanged. Staff tests of the model indicate that it provides reasonably accurate first-order approximations of the effects of long-distance rate changes on local rates.

The model used did not include the financial data of the independent telephone companies operating primarily in Newfoundland, Quebec, Ontario, Alberta and British Columbia. In the case of Alberta, however, it was assumed for the purpose of this exercise that 30 per cent of any AGT revenue change due to long-distance rate reductions would be distributed among '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.

Chapter 3 of the Working Papers contains a detailed analysis of a range of scenarios involving one-time changes (in 1986) to long-distance rates, including increases and decreases to inter-provincial and intra-provincial rates; decreases to inter-provincial rates only; decreases to intra-provincial rates for Bell Canada and B.C. Tel; the sensitivity of results to various demand elasticity assumptions and the like. In addition, the estimated effects for 1990 of gradual reductions to long-distance rates were determined, including a freeze on various inter-provincial and intra-provincial rates, and a freeze on the contribution from these rates to other services. A limited range of scenarios has been chosen from that analysis to illustrate the effects of long-distance rates on local rates - namely, decreases to inter-provincial long-distance rates for all provinces; decreases to inter-provincial and intra-provincial rates for all provinces; and decreases to intra-provincial rates for Bell and B.C. Tel only.

Tables 2 and 3 present the ranges of increases to local residence and business rates, respectively, resulting from the first two scenarios. Local rate changes are presented under the assumption of recovering the shortfall in long-distance revenues by equal percentage increases to residence and business local rates. The elasticity of demand for long-distance service was assumed to be -0.8 in both scenarios.

Elasticity of demand is a measure of anticipated changes in customer demand in response to price changes. For example, an elasticity of -0.8 means that a price reduction of 1 per cent would result in increased demand for long-distance service of approximately 0.8 per cent. While Peat Marwick, at the request of the examination, made its projections for the three alternative assumptions, of -0.4, -0.8 and -1.3, only the results for -0.8 are presented in detail. This is done for convenience of presentation and does not reflect any judgement as to the actual value of the elasticity of demand. It should be noted that the elasticity of demand was treated in this manner since there is no general consensus on its value. Industry views on the actual value vary over the range studied. The importance of the elasticity of demand in the modelling exercise is that the value assumed affects the level of long-distance revenues generated as a result of rate changes and, hence, the compensating change in local revenues required.

Figures 4 and 5 estimate the impacts on subscribers in each province and on the country as a whole for the second scenario (i.e. reductions to inter-provincial and intra-provincial rates). Using this second scenario to illustrate, a reduction of 10 per cent in inter-provincial

TABLE 2
Range across provinces of local residence rate increases from long-distance rate reductions*
(Assuming equal percentage local rate increases for residence and business subscribers)

% Reduction in Long-Distance Rates	Range of % Increases to Local Rates	Range of $ Increases to Monthly Local Rates	$ Range of New Monthly Local Rates
10 (inter)	3.4 - 10.2	0.37 - 1.09	7.20 - 12.02
30 (inter)	13.3 - 39.1	1.46 - 4.12	9.08 - 15.05
50 (inter)	28.7 - 81.8	3.14 - 8.38	11.50 - 19.31
10 (inter) 10 (intra)	10.5 - 22.4	1.15 - 2.13	7.99 - 13.06
30 (inter) 15 (intra)	24.6 - 58.2	2.64 - 5.76	9.89 - 16.69
50 (inter) 20 (intra)	44.5 - 108.5	4.88 - 10.66	12.33 - 21.59

* Current average monthly local residence rates, by province, range from $6.53 to $10.96.

TABLE 3

Range across provinces of local business rate increases from long-distance rate reductions*

(Assuming equal percentage local rate increases for residence and business subscribers)

% Reduction in Long-Distance Rates	Range of % Increases to Local Rates	Range of $ Increases to Monthly Local Rates	$ Range of New Monthly Local Rates
10 (inter)	3.4 - 10.2	1.25 - 3.55	23.41 - 44.90
30 (inter)	13.3 - 39.1	4.92 - 13.47	29.54 - 52.11
50 (inter)	28.7 - 81.8	10.59 - 27.39	38.61 - 63.13
10 (inter) 10 (intra)	10.5 - 22.4	3.43 - 6.96	25.99 - 47.57
30 (inter) 15 (intra)	24.6 - 58.2	9.09 - 18.82	33.59 - 54.56
50 (inter) 20 (intra)	44.5 - 108.5	16.46 - 34.86	44.28 - 70.60

* Current average monthly local business rates, by province, range from $21.24 to $42.45.

FIGURE 4
1986 local residence rate increases
from long-distance rate reductions

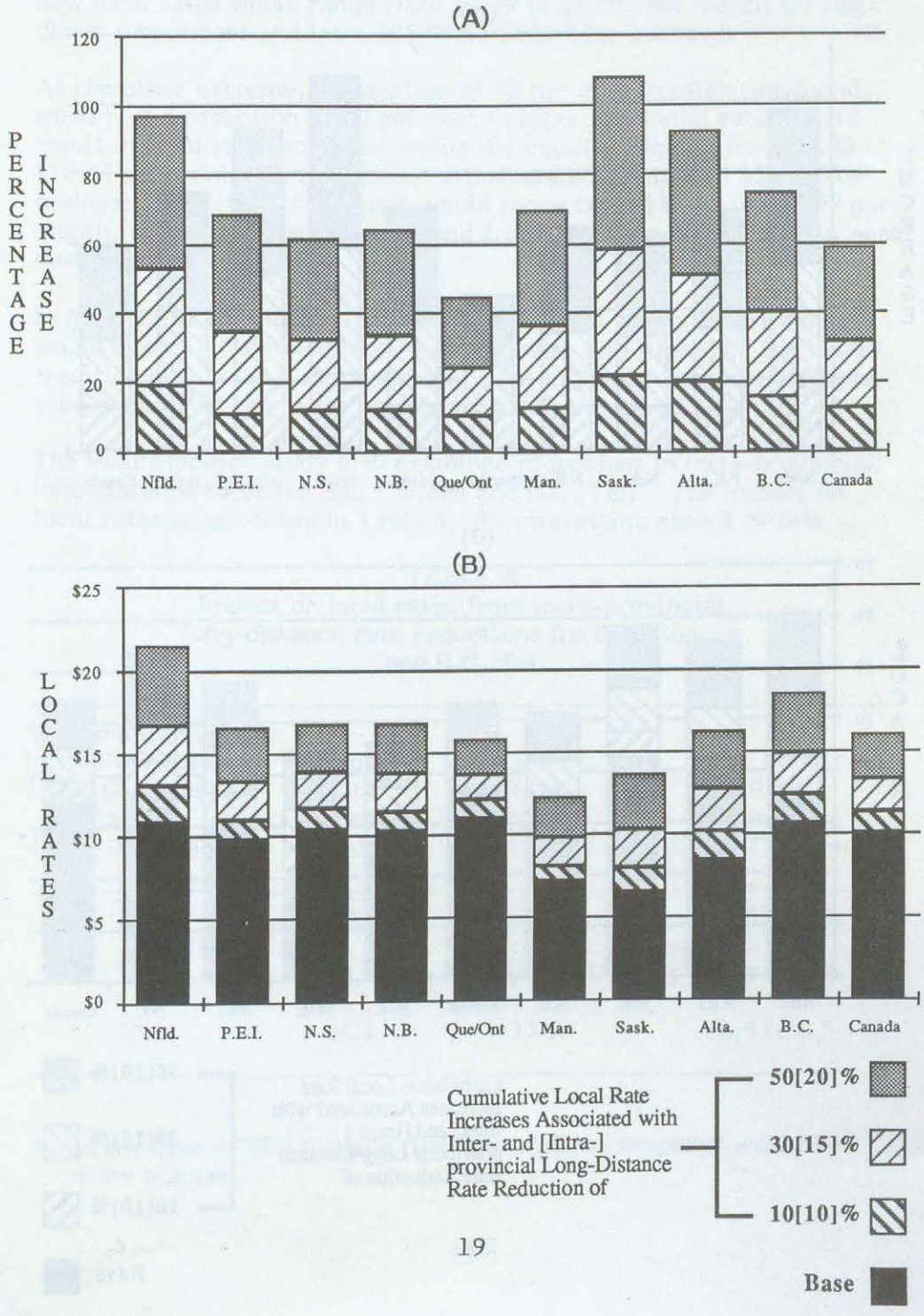
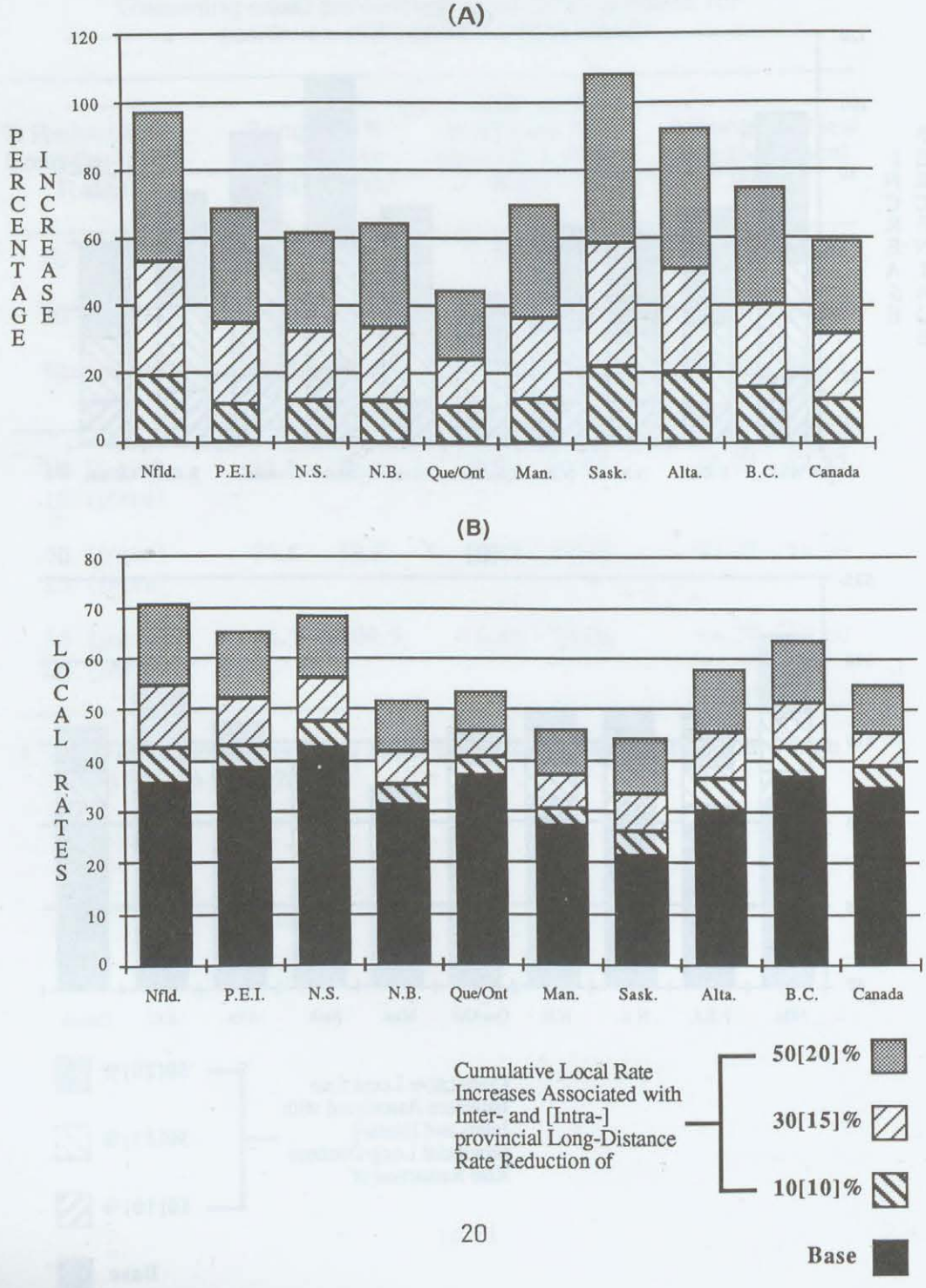


FIGURE 5
1986 local business rate increases
from long-distance rate reductions



and intra-provincial long-distance rates would result in local rate increases across the country ranging from $1.15 to $2.13 per month for residence subscribers and $3.43 to $6.96 for business. Corresponding new local rates would range from $7.99 to $13.06 per month for residence subscribers and from $25.99 to $47.57 for business.

At the other extreme, a reduction of 50 per cent in inter-provincial rates plus a reduction of 20 per cent in intra-provincial rates would result in local rate increases across the country ranging from $4.88 to $10.66 per month for residence subscribers and $16.46 to $34.86 for business. Resulting local rates would range from $12.33 to $21.59 per month for residence subscribers and from $44.28 to $70.60 for business customers.

In general, as the figures illustrate, the largest percentage increases would occur in Newfoundland, Saskatchewan and Alberta. The lowest resulting new rates would generally exist in Saskatchewan and Manitoba because of the lower base from which they start.

The Peat Marwick study also examined reductions in intra-provincial long-distance rates for Bell Canada and B.C. Tel.* The impact on local rates is presented in Table 4. An interesting aspect of this

TABLE 4
Impact on local rates from intra-provincial long-distance rate reductions for Bell Canada and B.C. Tel

% Reduction in Intra-Provincial Long-Distance Rates (Bell, B.C. Tel)	% Local Rate Increase (Bell)	% Local Rate Increase (B.C. Tel)	% Local Rate Decrease (Other Companies)
10	7.4	10.2	1.0 to 1.9
30	27.5	36.6	2.9 to 5.0
50	56.1	73.9	4.9 to 8.5

* In the case of Bell Canada, the term "intra-company" would be more precise.

scenario is that subscribers of other companies likely would experience decreased local rates. This effect results from the fact that the settled revenues of other Telecom Canada members would increase through the revenue settlement process. Increased settlement revenues result from the assignment of more Bell and B.C. Tel facility costs to intra-provincial long-distance service and away from inter-provincial service.

As noted earlier, the assumption in the modelling exercise as to the value of the elasticity of demand for long-distance service affects estimated revenues and, hence, local rates. The effect on local rates of the value assumed for the elasticity of demand is illustrated by the following example. Assuming an elasticity of -0.8, the average residential rate for Canada would be $14.22 per month in the scenario involving 50 per cent decreases to inter-provincial rates and equal percentage local rate increases for business and residence subscribers. With elasticity assumptions of -0.4 and -1.3, the averages would be $15.08 and $12.84, respectively. In comparison to the level of rates involved, the impact of changing the elasticity of demand is relatively small.

As noted above, the effects of long-distance rate changes on the independent telephone companies were not estimated in the Peat Marwick study. Chapter 3 of the Working Papers explores available evidence respecting the estimated effects on the independent companies. On average, the independent telephone companies in Ontario generate approximately the same percentage of total revenues from long-distance services as Telecom Canada members. It is concluded from this that the estimated impacts on Telecom Canada members would be reasonably indicative of the impacts on the independent companies as well, at least for Ontario. There are, however, wide variations among the independent companies in the percentage of revenues generated by long-distance services, suggesting that those impacts would be unevenly distributed.

3.2 Effects of rate level changes on average customer bills

This section examines how average customer monthly bills would change as a result of decreases to long-distance rates together with offsetting local rate increases. In particular, key aspects of the scenarios discussed above are used with telephone company billing data to analyse the net effects on customer bills. Billing data used

in this analysis were supplied by telephone companies operating in each province. A detailed analysis is contained in Chapter 9 of the Working Papers.

Tables 5 and 6 provide estimates, for residence and business customers, respectively, of average bills calculated from the long-distance and local rate changes presented previously for the scenarios involving decreases to inter-provincial long-distance rates, and to both inter-provincial and intra-provincial long-distance rates. Consistent with that discussion, results are presented for a long-distance demand elasticity of -0.8 and assuming equal percentage rate increases to residence and business local rates. Required data were available to allow average bills to be calculated for residential subscribers served by Telecom Canada members in all provinces and, in some cases, for urban versus rural subscribers. Billing data for business subscribers were available from only a limited number of telephone companies.

An indication of the extent of changes to average bills can be ascertained from the current average or "status quo" bill presented with each case analysed. In interpreting these figures, it should be noted that average bills were calculated on a strict reprice basis based on applying rates under alternative scenarios to current demand levels. The reprice bill, in other words, does not include additional expenditures occasioned by increased demand due to changed rates. Table 5 indicates that average monthly residential bills would change very little from current averages. Table 6 shows that average bills of private branch exchange (PBX) customers - mostly large businesses - would decrease substantially in most areas. Single-line customers - mostly small businesses - would experience small decreases in Ontario and Quebec and somewhat larger average bill increases elsewhere.

The percentage distribution of the effects of long-distance/local rate changes on residential bills is shown in Table 7. Whereas the average residential bill in most provinces would remain largely unchanged, the majority of residential subscribers would experience some bill increases, except in Bell Canada territory. The distribution of effects is such that a small number of bills are predicted to decrease by comparatively large amounts and a larger number are predicted to increase by a small amount. For example, in the case of 10 per cent reductions to inter-provincial and intra-provincial rates, the majority of bills are predicted to change by less than $5.00. Depending on the province, 4.2 per cent to 9.7 per cent of monthly bills are estimated to decrease by more than $5.00 and no bills are predicted to increase by

TABLE 5

Effects of long-distance/local rate changes on average residential monthly bills (1985*)

(In dollars)

Rate Change Scenario**	NFLD	P.E.I.		N.S.		N.B.		ONT/QUE (BELL)		MAN.	SASK.	ALTA		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-Provincial 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
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 Provincial Rates by														
10%/10%	37.41	30.37	27.53	32.36	30.99	31.93	30.27	27.95	25.96	21.90	34.09	38.29	41.84	33.40
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 Newfoundland Tel, Island Tel, MT&T and B.C. Tel, bill estimates are for 1986.

** Local rate increases for these scenarios are as previously described.

TABLE 6

Effects of long-distance/local rate changes on average business monthly bills (1985*)

(In dollars)

Rate Change Scenario**	P.E.I.		N.S.		N.B.		ONT/QUE (BELL)		ALTA	
	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-Provincial Rates by										
10%	68.46	147.00	64.57	181.00	95.81	815.00	146.00	4868.00	66.93	693.00
50%	77.04	174.00	72.11	192.00	98.60	774.00	145.00	4599.00	74.39	641.00
Reduce Inter/ Intra Provincial Rates by										
10%/10%	68.31	147.00	64.26	180.00	94.76	802.00	144.00	4611.00	67.03	676.00
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, bill 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 previously described.

TABLE 7
Percentage distribution of effects of long-distance/local rate changes on residential bills (1985*)

Rate Change Scenario**	Monthly Bill Change	NFLD	P.E.I.	N.S.	N.B.	ONT/QUE (BELL)	MAN	SASK	ALTA	B.C.
Reduce Inter/Intra Provincial Rates by 10%/10%	Decrease greater than $5.00	5.4	4.2	7.1	7.4	6.4	6.6	9.3	9.7	8.0
	Decrease $0-$5.00	12.6	38.3	34.4	30.6	46.1	29.4	40.9	37.0	23.0
	Increase $0-$5.00	81.9	57.5	58.6	62.0	47.4	63.9	49.8	53.5	69.0
	Increase greater than $5.00	0	0	0	0	0	0	0	0	0
Reduce Inter/Intra Provincial Rates by 50%/20%	Decrease greater than $5.00	9.5	16.7	16.8	20.9	23.0	11.1	26.0	17.2	16.0
	Decrease $0-$5.00	5.5	15.0	14.6	11.41	27.8	14.2	13.9	10.7	6.5
	Increase $0-$5.00	20.4	28.3	31.3	35.5	48.0	44.6	29.9	14.9	29.5
	Increase greater than $5.00***	65.5	40.0	37.3	32.2	1.2	30.0	30.2	57.4	48.0

* For Newfoundland Tel, Island Tel, MT&T and B.C. Tel, bill estimates are for 1986.

** Local rate increases for these scenarios are as previously described.

*** No increase is larger than $10.66.

more than $5.00. In the case of a 50 per cent reduction to inter-provincial long-distance rates and a 20 per cent reduction to intra-provincial rates, depending on the province, 9.5 per cent to 26 per cent of monthly bills are estimated to decrease by more than $5.00. From 1.2 per cent to 64.5 per cent are estimated to increase by more than $5.00. Furthermore, Chapter 9 of the Working Papers shows that estimated decreases in a small number of bills could be greater than $100.00 per month; alternatively, no bills in any province are predicted to increase by more than $10.66 per month.

3.3 Alternative rate structures

In addition to adjusting the relationship between long-distance/local rate levels, changes to both local and long-distance rate structures are possible. In contrast to the counterbalancing long-distance/local rate level changes discussed previously, structural change refers to alternative rate structures within individual service categories. Such alternative rate structures could result from changing the basic principles and practices under which services have been provided.

Throughout the course of the examination, a number of alternative local and long-distance rate structures were identified. These alternatives are discussed here with further reference being made at other appropriate points in the report.

3.3.1 Alternative local rate structures

Alternative local rate structures include structural changes within a flat-rate local framework and the adoption of local measured service.

Compressing the number of rate groups

The telephone companies indicate that the cost of providing local service per access line decreases as the number of access lines in an exchange increases. However, rates for local service, with some exceptions, are higher in exchanges with a greater number of access lines (subscribers in larger rate groups, who have access to large numbers of telephones without incurring long-distance charges, enjoy increased value under the value-of-service principle). An alternative rating approach would be to reduce the number of rate groups or, in the extreme, to eliminate them altogether.

Such pricing might be supported on the basis of bringing rates more closely in line with costs. Subscribers are, however, generally concentrated in urban rate groups. Thus, to obtain even a modest increase in local revenues without changing rates for urban centres could mean substantial local rate increases in many small exchange areas. Where the difference between the lowest and highest rate groups is small for local service, the elimination of rate groups could be more feasible.

Reducing or eliminating residence/business rate differentials

By virtue of the value-of-service principle, rates for residence and business subscribers differ substantially. An alternative rating approach would be to reduce existing residence versus business rate differentials. Whether this approach would be more or less in line with the approach of recovering costs from those who cause them remains to be determined.

Making extended area service more generally available

There is continued pressure on telephone companies to expand the availability of extended area service (EAS) to reduce long-distance expenses from calling nearby exchanges. Expanded EAS could be considered as a partial response to the pressures outlined earlier for lower long-distance rates. Whether such 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.

Creating a separate rate for access

It is generally recognized that costs are incurred by telephone companies to allow customers to access the network, and that these costs - i.e. of equipment used to connect subscribers to a telephone company central office - are for the most part not usage sensitive. What is at issue is the amount and the manner in which these costs should be recovered from different services.

Methods of recovering access costs include continuation of the present system in which access costs are implicitly apportioned to local service and long-distance usage and recovery of access costs on a flat-rate basis. Bell Canada and B.C. Tel consider that a principle element of rate rebalancing should be the recovery of all access costs from

either local service revenues or a separate revenue category. In the United States, 25 per cent of access costs are assigned to federal jurisdiction; these costs were formerly recovered through usage-sensitive long-distance rates. Increasingly, a portion is being recovered through flat-rate charges to end users - in large part because of the threat of bypass in the US. A portion is also recovered through charges to long-distance competitors.

If, in the future, access charges were to be recovered on a flat-rate basis by particular jurisdictions, the possibility specifically exists to identify access as an element on subscribers' bills - subscribers may, however, find this a difficult charge category to comprehend. Alternatively, local rates could implicitly contain an access charge which would simply be seen by subscribers as higher local rates.

Local measured service

With the adoption of local measured service (LMS), subscribers could be charged for actual use of the local telephone network based on such factors as frequency, duration, distance, time of day and/or day of week of local calls.

Most industrialized countries outside North America use some form of LMS to price 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.

The theory underlying the introduction of LMS is to attempt to recover costs more explicitly from those who cause them - which could be important to low-usage customers in an environment where local rates are higher than at present - and to promote more effective use of the network. Various surveys of customer attitudes in Canada suggest, however, that most subscribers are opposed to the introduction of LMS. The benefits of LMS could be outweighed by the costs and difficulties of implementing a measured service, including increased capital costs for measurement equipment, increased bill processing costs and negative customer reaction.

3.3.2 Alternative long-distance rate structures

In terms of changing the structure of long-distance rates, several possibilities are available. First, it is possible, within individual long-distance rate schedules, to alter the distance dependence of long-

distance rates. This has been the direction of recent rate changes proposed by a number of telephone companies - namely, to raise or maintain MTS and WATS rates for relatively short distances while lowering those for longer distances. Second, it is possible to alter the rate relationships between substitutable long-distance services, such as MTS, WATS and private lines, in order to alter the migration from one service to another, change the relative contribution to other services or generate additional revenues. Third, it is possible to alter existing or introduce new time-related discounts within long-distance services to ensure more effective use of the network or generate additional revenues.

3.4 Assessment

A variety of alternative rating structures were examined. Impacts on local telephone service rate levels were estimated for each province as a consequence of changes to long-distance rates. For example, lowering inter-provincial and intra-provincial long-distance rates across the country by 10 per cent would result in residential local rate increases ranging from 10.5 per cent to 22.4 per cent, depending on the province. This would constitute actual dollar increases ranging from $1.15 to $2.13 per month. Alternatively, lowering inter-provincial rates by 50 per cent and intra-provincial rates by 20 per cent would result in local rate increases ranging from 44.5 per cent to 108.5 per cent and actual dollar increases ranging from $4.88 to $10.66. The same analysis was carried out for local business rates.

An analysis of average monthly bills associated with the reductions in inter-provincial and intra-provincial long-distance rates and the local rate increases discussed above predicts that average monthly residential bills would change very little from current averages. Whereas the average residential bill in most provinces would remain largely unchanged, the majority of residential subscribers would experience some bill increases, except in Bell Canada territory. The distribution of effects is such that a small number of bills are predicted to decrease by comparatively large amounts and a larger number are predicted to increase by a small amount. For example, in the case of 10 per cent reductions to inter-provincial and intra-provincial rates, the majority of bills are predicted to change by less than $5.00. Depending on the province, 4.2 per cent to 9.7 per cent of monthly bills are estimated to decrease by more than $5.00 and no bills are predicted to increase by more than $5.00. In the case of a 50 per cent reduction to inter-provincial long-distance rates and a 20 per cent reduction to intra-

provincial rates, larger percentages of monthly bills are predicted to decrease or increase by more than $5.00. Estimated decreases in a small number of bills could be greater than $100.00 per month; alternatively, no bills in any province are predicted to increase by more than $15.00 per month.

The analysis of average monthly bills also predicts that business customers generally would experience reduced average bills. This would not, however, be the case in all provinces or for all types of customers.

In some cases, alternative rate structures may be worth considering.

4.0 ANALYSIS OF CURRENT AND ALTERNATIVE TELEPHONE SERVICE RATES

This chapter presents an analysis of current and alternative rate levels and structures in terms of the five criteria set out in the Terms of Reference. The advantages and disadvantages of current rating principles and practices are considered in respect of these criteria. Additionally, the alternative rate levels and structures presented in the previous section are discussed with respect to their impacts on telephone subscribers in all areas of Canada. This section also serves to identify the potential adverse effects of current and alternative pricing systems.

4.1 Maintaining universal availability of affordable telephone service

4.1.1 The goal of universal availability

Maintaining universal availability of affordable telephone service is a collective goal of federal and provincial telecommunications policies. Federal, provincial and territorial Ministers responsible for Communications reiterated this goal at the close of their two-day conference in February 1986 and stated that priority should be given to "maintaining universal access to affordable telephone service for all Canadian consumers." Central to the following discussion of this goal are the concepts of the availability and the affordability of telephone service.

4.1.2 Current levels of availability and affordability

The percentage of households with local telephone service, often termed the penetration rate or level, is the most widely used measure of telephone service availability. Table 8 presents 1975 and 1985 telephone penetration levels for Canada and each of the provinces. The penetration level for Canada as a whole in 1985 was 98.2 per cent, with the lowest rate occurring in Newfoundland (94.4 per cent) and the highest in Ontario (99.0 per cent). Clearly, most Canadians find local telephone service to be both available and affordable. With the exception of New Brunswick, telephone penetration levels increased from 1975 to 1985. Canadian penetration levels generally exceed those of other industrialized countries. In 1985, the US penetration level was 91.8 per cent, up from 91.5 per cent in 1980. Penetration levels in 1982 for countries outside of North America include: Japan - 82 per cent, Australia - 86 per cent, the Netherlands - 93 per cent, the United Kingdom - 87 per cent, and Sweden - 100 per cent. Levels for other countries can be much lower.

TABLE 8
Telephone penetration levels - 1975, 1985
(Percentage of households with telephone service)

	1975	1985
CANADA	96.4	98.2
Newfoundland	90.4	94.4
Prince Edward Island	90.0	95.2
Nova Scotia	92.8	96.7
New Brunswick	95.3	94.9
Quebec	96.6	98.6
Ontario	97.5	99.0
Manitoba	97.1	97.2
Saskatchewan	95.2	97.5
Alberta	96.3	98.0
British Columbia	95.5	97.7

Telephone service penetration levels are, however, not uniform when examined in terms of factors that can affect either the availability or the affordability of service. Penetration levels vary with such factors as geography, income level and subscriber age. Within each province or territory, there are specific regions where penetration levels fall considerably below the Canadian average. For example, in 1981 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. 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. Considered generally, penetration levels are lower than average in rural and remote areas, among low-income households, and for households where the household head is between 15 and 25 years of age, notably in Atlantic Canada.

Detailed statistics on the geographic and demographic factors affecting penetration levels, including results of a study of non-subscribers conducted for the examination by CROP Inc., are presented in Chapter 4 of the Working Papers.

In terms of affordability, subscribers in major cities across Canada spend approximately 0.3 per cent to 0.5 per cent of disposable income on local telephone service. Statistics Canada figures also indicate that, for the last ten years, the real cost of subscribing to telephone service has declined appreciably. In addition, telephone rates have shown much smaller increases than prices for many other goods and services, for example, housing and transportation.

4.1.3 Impact of alternative rate levels on universal availability

With increases to local rates as, for example, those associated with the rate restructuring alternatives discussed earlier, it has been generally contended in the past that some subscribers would choose to discontinue telephone service. A recent study by the US Department of Commerce's National Telecommunications and Information Administration, however, found that in those states where local telephone rates increased between January 1984 and March 1985, no statistical relationship could be detected between local rate increases and changes in penetration levels. That study suggested three reasons why the penetration level did not drop with increased local rates: customers switching to lower cost local measured service, offsetting lower long-distance charges and growth in real incomes.

In Canada, factors favourable to telephone demand continue to exist, such as rising prices for alternative means of communication, falling real prices for long-distance services, rising personal incomes, the expansion of the telephone network and an aging population. To the

extent that these factors are acting on telephone demand in the opposite direction of higher local prices, they would help to offset any effects of local service price increases.

Other statistical evidence reviewed in the Working Papers suggests that the sensitivity of demand for local service to local price changes has been declining over time and is currently very low both in Canada and the United States. In this regard, a statistical model developed by staff assigned to the examination estimated that far fewer subscribers would drop off the network than earlier thought. For example, while Bell Canada, during the CRTC Interexchange Competition proceeding, estimated that 160,000 residential telephone subscribers in its service territory would drop off the network if local rates increased by 100 per cent, staff calculations estimate that approximately 60,000 would drop off. Details of the staff calculations are presented in Table 9.

The results from the staff calculations also suggest that, while there would be wide variations across regions in the effects of price changes on telephone penetration, the overall number of drop-offs and the change in penetration would be relatively small. Furthermore, there are a number of reasons to suggest that the staff model has overestimated the number of drop-offs from the network. Specifically, the model was not able to capture the effects of certain "omitted" variables on consumer decisions to subscribe to service. In particular, it did not account for the availability of two-or-more party service and did not allow for reduced long-distance rates associated with increased local rates.

In respect of this latter point, subscribers are sensitive to the total cost of their telephone service. For many residential subscribers, as indicated previously, increased local charges would be offset by decreases in long-distance charges. Such offsetting effects should moderate the impact of higher local rates on drop-offs from the network.

In the light of available evidence, it thus seems likely that price changes would have little effect on telephone subscribership levels. They may, however, result in financial hardship for some subscribers.

Detailed discussion of the impact of alternative rate levels on the universal availability of affordable telephone service can be found in Chapter 4 of the Working Papers. That chapter also discusses factors other than monthly local rates which can have an important bearing on

TABLE 9

Estimates of drop-offs and consequent penetration levels under alternative local rates

	Increase in Local Rates							
	10%		25%		50%		100%	
	Drop-offs	% Pen.	Drop-offs	% Pen.	Drop-offs	% Pen.	Drop-offs	% Pen.
Newfoundland	800	93.9	1 900	93.2	4 000	91.9	7 700	89.6
P.E.I.	200	94.8	500	94.1	900	93.1	1 700	91.1
Nova Scotia	900	96.4	2 400	95.9	4 500	95.2	8 700	93.8
New Brunswick	1 200	94.4	2 600	93.8	5 200	92.7	10 300	90.5
Quebec	2 400	98.5	7 100	98.3	16 600	97.9	30 900	97.3
Ontario	2 900	98.9	6 200	98.8	16 000	98.5	29 000	98.1
Manitoba	1 100	96.9	2 300	96.6	5 000	95.9	9 700	94.7
Saskatchewan	800	97.3	2 200	96.9	4 000	96.4	8 400	95.2
Alberta	1 700	97.8	4 200	97.5	7 500	97.1	15 000	96.2
British Columbia	2 300	97.5	5 600	97.2	12 200	96.6	23 300	95.6

the decision either not to subscribe or to discontinue telephone service. These include the level of installation charges and, for some consumers, the payment of deposits - which may impose an economic burden. The chapter also includes a discussion of termination of service as it affects subscribership. Such termination may result from non-payment of bills, for example, for long-distance charges.

As a final point, lower long-distance rates may, in fact, enhance affordability of telephone service for Canadians in areas where access to reasonably priced long-distance calling is more important than access to local calling. Subscribers in northern, remote and rural areas of the country may find this to be the case. For example, subscribers in northern Canada, with a community of interest throughout the North or with southern Canada, may regard lower long-distance charges, because of the distances involved and even if accompanied by higher local charges, as best promoting universal availability.

4.1.4 Assessment

Canada has one of the highest levels of telephone service penetration in the world - 98.2 per cent of Canadian households subscribed to telephone service in 1985. Current high penetration levels maximize the value of telephone service for all subscribers; almost the entire population may be reached by telephone. Furthermore, local telephone service costs represent a small proportion of disposable incomes for most Canadians - generally less than 0.5 per cent.

Based on the best evidence available to date, including a statistical model developed by staff, it is concluded that increased local rates would be unlikely to result in significant reductions to telephone service penetration levels, even for price increases of as much as 100 per cent. This position differs markedly from previous statements made by a number of parties that penetration levels would be seriously affected.

4.2 Fostering effective use of the public telecommunications network

This section examines the effects of current and alternative local and long-distance rates on fostering effective use of the public telecommunications network. The term "effective use" may be taken to involve two principles. First, where the resulting cost savings exceed any loss of value to customers, traffic should be shifted from peak

periods of activity to off-peak periods. Second, off-peak calling should be encouraged where its value exceeds its costs and peak calling should be discouraged where its costs exceed its value. Thus, a rate design that encourages reduced costs by producing a more even distribution of calling than at present or encourages increased usage without additional net costs could provide for 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.

4.2.1 Local and long-distance traffic characteristics

An analysis of the impact of current and alternative rate structures on effective use of the network was made on the basis of local and long-distance traffic patterns obtained from the telephone companies. Traffic information was provided, as available, for typical urban, suburban and rural locations during the companies' busy month for 1984 and 1985, and during typical business and non-business days.

Traffic information submitted to the examination by the telephone companies is summarized in Chapter 6 of the Working Papers. Examples of typical traffic patterns for urban, suburban and rural local traffic and urban long-distance traffic are presented in Figures 6 and 7.

Based on available traffic information, it would appear that, in general, morning business-day peaks in urban and suburban areas for both local and long-distance calling build gradually from 9:00 a.m. and fall off sharply in the noon-hour period. A second period of activity occurs during mid-afternoon and a third during the early evening. Generally, the highest peaks in urban areas occur during the morning, whereas the highest for suburban areas occur during the early evening period. Rural local traffic either has many more small peaks than for urban and suburban areas or is relatively flat throughout the day. Rural long-distance traffic results are sketchy, but it appears that traffic levels do not vary substantially throughout the day.

4.2.2 Pricing to maximize effective use

Time-related discount service pricing, in theory, serves to move telephone traffic from peak to off-peak periods. This results in less deployment of resources and, hence, a smaller rate base and lower rate

FIGURE 6
Time-of-day local telephone
traffic variation (NBTel)

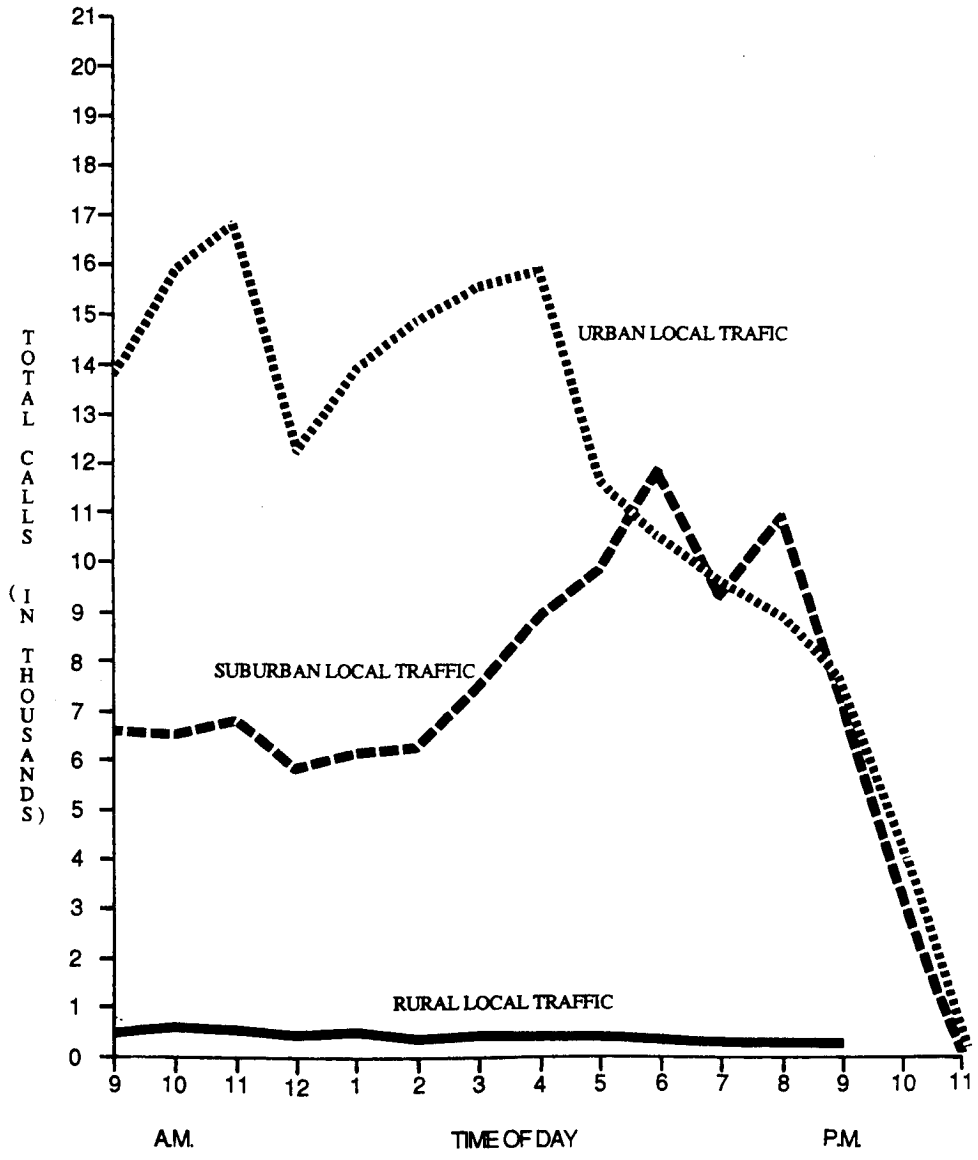


FIGURE 7
Time-of-day long-distance
traffic variation (NBTel - Saint John)

levels. Discounts may also serve to stimulate new calls or increase calling minutes during off-peak periods so as to generate new net revenues. Current telephone company long-distance tariffs contain time-related discounts which have been introduced to provide for more effective use of the network. Discounts for long-distance calls could potentially be redesigned to reduce further peak demand and/or generate new net revenues.

Local measured service (LMS), in contrast to present flat-rate pricing of local service, may be able to encourage off-peak usage or to discourage economically inefficient calling. An LMS rate structure may thus result in more optimal use of network resources. Whether or not it would be desirable to use LMS for this purpose would depend on a complete assessment of all of the benefits and all of the costs.

The potential success of time-of-day discount pricing schemes depends on the types 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, tends to be much less flexible in this respect than residential calling. However, although the distribution of demand may be relatively more flexible for residential calling, a considerable number of residential calls made during peak periods 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.

4.2.3 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.

4.2.4 Assessment

Effective use of the network can be fostered by pricing systems that redistribute demand to underemployed resources or suppress economically inefficient use. Local measured service could, in theory, foster effective use by permitting the shifting of demand and the suppression of economically inefficient use. A number of costs are, however, associated with LMS and it is not clear as to whether or to what extent net benefits would arise. Effective use of network facilities employed in the provision of long-distance services is and could potentially be further promoted by appropriate time-related discount service pricing. However, there are limits on the extent to which subscribers can or will shift calling in response to price reductions. Additional information would be required before adopting either additional time-related discounts for long-distance services or LMS. Effective use may also be fostered by utilization of network capabilities to provide new services to the public and new revenues for the industry.

4.3 Avoiding uneconomic bypass

4.3.1 The bypass issue

Bypass involves the selection by customers of alternatives to some or all of the local and long-distance services provided by the regulated telecommunications carriers. Uneconomic bypass is said to occur when services or facilities having a higher underlying cost than those provided by the regulated telecommunications carriers are chosen. Such a situation can occur when the rates charged by the carrier are held at a level such that the consumer realizes a saving by using the lower priced but higher cost bypass alternative; such bypass may be economically inefficient.

The following discussion pertains to the general notion of bypass rather than to the more limited concept of uneconomic bypass. While easy to define in theory, uneconomic bypass is difficult to determine in practice. This results from a number of factors, among them that the costs of a particular service or technology are likely to vary over time, that there is lack of agreement on how to measure telephone company costs, and that it is difficult to ensure that all bypass system costs are included in any analysis. Furthermore, some bypass activities, while not "uneconomic", may result in lost contribution or revenue erosion. Consequently, it is not practical or useful to limit the following discussion solely to uneconomic bypass.

Those who see bypass as a threat argue that users, and particularly large users with enough usage to consider developing alternative systems, may be induced, because of the pricing system, to avoid carrier services. This could cause significant erosion of revenues and might result in stranded carrier facilities. Large-scale bypass could also cause significant upward pressure on rates, resulting in more incentives for others to bypass. This cyclical process could ultimately affect the ability of carriers to provide affordable services.

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 the argument are not universally accepted. Many parties contend that the degree to which long-distance services contribute to local service is not proven. Others contend that bypass is synonymous with competition, and that by casting it in a negative light there may be less support for competitive initiatives. Still others contend that the extent of bypass has been overstated and that the principal form of bypass is by the carriers themselves, in providing discounted services to large users.

4.3.2 The current extent of bypass in Canada

Detailed discussion of the incentives, opportunities and incidence of bypass in Canada is contained in Chapter 5 of the Working Papers. That chapter discusses the extent of bypass within Canada (domestic bypass) and bypass through the US and other countries (international bypass). Domestic bypass includes the bypass of local telecommunications systems (local bypass), for example, by local area networks and the bypass of interexchange carrier systems (interexchange bypass), for example, by inter-city private networks.

The conclusion drawn in the Working Papers is that the current extent of bypass is limited, both domestically and internationally. This results in part from current pricing principles and practices, but also from associated policies of the federal and provincial governments.

The key factors that limit the extent of bypass are considered to be the following:

1) The availability of discounted telephone company services (e.g. WATS and private line) for customers who might otherwise engage in bypass;

2) Current federal microwave licensing policy which limits the number of licensed systems to prevent uneconomic duplication of telephone company facilities. Furthermore, as a general licensing policy, private microwave system capacity cannot be sold to the general public;

3) Restrictions on the interconnection of private satellite earth stations to the facilities of the telephone companies which limits bypass using satellite facilities;

4) Regulatory restrictions that limit the interconnection to the telephone companies of private intraexchange and interexchange networks;

5) The lack of viable alternatives for basic local telephone services;

6) The absence of MTS/WATS competition and associated network access charges and, in many jurisdictions, other forms of interexchange competition; and

7) With respect to international bypass, large Canada-US exchange rate differentials, the high cost of access to resellers (in part due to Canadian long-distance rates) and Canadian telecommunications policies that restrict bypass through the US and other countries. The 1986 revenue impact of international bypass, other than by private line users, has been estimated at only about $4.6 million for the whole of Canada.

4.3.3 Potential future bypass

Various changes in events could significantly alter the situation with regard to bypass in Canada. For example:

1) Liberalization of microwave licensing could result in the proliferation of private microwave systems and an erosion of interexchange service and local channel revenues;

2) Interconnection of private satellite earth stations - if, when and where permitted - could contribute to an erosion of telephone company private-line revenues;

3) Customer control of PBXs, coupled with a greater awareness of opportunities to bypass, could increase customer interconnection of prohibited networks through a PBX into the public-switched telephone network;

4) A reduction in Canada-US exchange rate differentials could create positive incentives to utilize cross-border resale alternatives; and

5) Restructuring of long-distance rates could reduce the incentives for interexchange bypass; offsetting local rate increases may, however, increase incentives for local bypass.

4.3.4 Assessment

The current extent of bypass of telecommunications carriers' facilities, both domestically and internationally, has been found to be minimal. Bypass is deterred by current pricing principles and practices as well as by the radio spectrum licensing, interconnection and other policies of the federal and provincial governments, and by Canada-US exchange rate differentials. Removal of some or all of these deterrents could result in increased bypass activities in Canada.

4.4 Facilitating cost-effective business communications and encouraging technological and service innovation

4.4.1 Major characteristics of business use of telecommunications services

Canadian business has reached a high level of dependence on telecommunications services for the efficient and effective conduct of business activities. On a local basis, businesses depend on the ready availability of a range of local telecommunications services for customers to reach them, for them to reach suppliers, and to market their goods and services. Businesses that operate on a regional, national or international basis depend additionally on the ready availability of high quality, reasonably priced long-distance telecommunications services to ensure efficient operation and marketplace competitiveness. Information is increasingly a strategic resource of business. Efficient telecommunications services can enhance the value of this resource. Data communications services play an increasingly important role in this regard, as indicated by the findings of a recent study that 23 per cent of telecommunications expenditures for large businesses are for data services.

A relatively small number of businesses generate the majority of business use of telecommunications services. Data from the telephone companies indicate, for example, that approximately 5 per cent of business customers generate from 40 per cent to 70 per cent of MTS/WATS revenues, depending on the company. Input-output data from Statistics Canada also indicate that 5 per cent of industries generate 62 per cent of business telephone and telegraph expenses. Thus, while all businesses depend on good quality, reasonably priced services, a minority generate the most use. For those businesses, telecommunications services are particularly critical to business success.

4.4.2 The importance of telecommunications costs for business

Statistics Canada data indicate that in 1981 Canadian business spent about $4 billion on telephone and telegraph services, approximately 0.7 per cent of their total input costs for goods and services. This percentage, while small, has been growing - from 0.54 per cent in 1961, to 0.6 per cent in 1971, to the 1981 level - and appears to indicate increasing use by businesses and faster growth of industries that make relatively greater use of telecommunications services.

The ten industry sectors with the highest percentage of expenditures on telephone and telegraph services are presented in Table 10. In 1981, they accounted for 21 per cent of Canada's Gross Domestic Product and are, hence, important to the Canadian economy. In that year, these ten industry sectors alone spent almost $2 billion on telephone and telegraph services, approximately 50 per cent of the total of such expenditures by business. Telephone and telegraph expenditures ranged from 1.7 per cent to 5.2 per cent of the total costs of purchased inputs for this group. The industry sector categorized by "Other Financial, Insurance and Real Estate" spent the largest amount in absolute terms, $555 million.

Data from other sources confirm the relatively small size of telecommunications expenditures relative to other expenditures by Canadian business. A recent study by D.A. Ford and Associates found that "...total telecommunications costs represented a relatively small share of total purchased inputs, ranging from a low of 0.7 percent to a high of 11.9 percent." Market data from a survey of Canadian business commissioned by the examination produced similar findings. Survey results, however, show considerable variation among firms in the

TABLE 10
Industry sectors with highest percentage expenditures on telephone and telegraph services, 1981

Industry Sector	Annual expenditure on Telephone & Telegraph ($ millions)	Telephone & Telegraph as % of all purchased inputs
Radio and TV Broadcasting	87	5.2
Health Services	209	3.0
Banks and Credit Unions	201	2.8
Rwy Transport	148	2.7
Misc. Services to Business	191	2.4
Advertising Services	18	2.3
Wholesale Trade	461	2.1
Other Fin. Ins. & Real Es.	555	2.0
Construction - Other	7	2.0
Insurance	81	1.7

percentage of total expenditures devoted to telecommunications, with some firms being considerably above the average. Thus, while 68 per cent of firms surveyed reported expenditures on telecommunications that were 1 per cent or less of their total expenditures, 20 per cent reported expenditures of 2 per cent to 5 per cent, and 12 per cent reported 6 per cent or more.

Data from the survey also indicate that there are variations among firms in different provinces and between larger and smaller firms on expenditures for telecommunications services. Generally, a smaller

percentage of firms from the Atlantic provinces than elsewhere in Canada reported spending 2 per cent or more of total purchased inputs on telecommunications services, while the percentage from Quebec was considerably higher than the other provinces. The smallest firms (with 1-4 employees) spent somewhat more on telecommunications than larger firms as a proportion of total purchased input costs.

4.4.3 The impact of telecommunications costs on the international competitiveness of Canadian business

Concerns have been expressed by Canadian business representatives that the high levels of Canadian long-distance rates, in comparison to those in the United States, have a negative impact on the international competitiveness of Canadian business. These concerns have been expressed on a number of occasions, among them in a recent submission of the business group, Canadians for Competitive Telecommunications. In that paper, a number of comparisons of Canadian and US telecommunications rates are made which suggest that Canadian rates are significantly higher than US rates.

The results of the survey of business commissioned by the examination indicate that businesses in the sample attach little importance to telecommunications costs as a factor in the international competitiveness of Canadian business. Only 8 per cent of the firms considered telecommunications costs to be important, and those that did tended to be located in eastern and central Canada and to be relatively larger in size (50-99 employees). Firms in the wholesale, mining, manufacturing and financial sectors were most sensitive to the impact of telecommunications costs on international competitiveness.

With regard to the location of company facilities in Canada, the survey found that approximately 18 per cent of firms considered telecommunications costs to be important. The largest percentage of firms so reporting were in Quebec and the lowest were in western Canada. Larger firms (50-99 employees) attached more importance to telecommunications costs as a location factor than the smallest (1-4 employees). Firms in the manufacturing, agricultural and wholesale sectors attached the most importance to telecommunications costs as a location-influencing factor, while those in the retail and service sectors rated it lowest.

The D.A. Ford study referred to in the previous section also addressed the question of location, in this case for large Canadian businesses. This study found that telecommunications costs are rarely a primary consideration affecting the location of business activities in Canada versus the United States, or even relative to the location of company facilities within Canada.

4.4.4 Technological and service innovation

The ready availability of high quality, technologically advanced telecommunications products and services that support and enhance the conduct of business is of critical importance to Canadian businesses. This is not to suggest that costs are unimportant; Canadian businesses expect telecommunications products and services to be reasonably priced for the value received. Generally, businesses monitor telecommunications costs very closely because, like other costs, they affect profitability and competitiveness. Most large firms employ sophisticated telecommunications equipment and staff to control costs and ensure value for the funds spent. As a result, the mix of products and services they purchase is highly sensitive to the rates in effect, the capabilities offered and the perceived value of these services.

The question arises from the Terms of Reference as to whether or not existing rate structures have delayed the telephone companies' introduction of new services and facilities that embody new technologies. There is, unfortunately, little evidence to establish the role of pricing, although the development of markets for some services has been influenced by pricing.

The impact of rate structures on technological and service innovation is complicated by a variety of inter-related factors that come into play. Regulatory requirements are important because of their impact on the incentives for industry to introduce new services and technologies. If sanctioned by the regulator, high prices for new and innovative services may make them attractive to the carrier, but uneconomic to the user. The technological environment is also important. New technology has transcended the control of the carriers and regulators with the development of computer-based technologies and liberalization of terminal attachment. As a result, the introduction and pricing of services and features has become more influenced by customer demands, competitive pressures and technological developments than by regulatory requirements.

4.4.5 Assessment

The main conclusion to be drawn from the preceding analysis is that for the majority of Canadian businesses, telecommunications costs represent a relatively small portion of the total costs of doing business. It is surmised that rate changes would have only small impacts on the overall cost structure and the performance of Canadian business in both domestic and international terms, even for large price changes to long-distance and local services. There are, however, wide variations among firms in the importance of telecommunications costs, and for some industry sectors and subsectors these costs are more significant than for others.

Insufficient information is available to indicate, except in a general way, the characteristics of businesses that view telecommunications costs as particularly important. For example, information-intensive components of Canadian business are surmised to be so characterized. In addition, concern for telecommunications costs can be particularly acute for businesses whose main competition comes from US firms that have lower telecommunications costs, particularly lower long-distance costs.

While telecommunications costs are generally not a critical factor, the availability of high quality, technologically advanced telecommunications products and services is essential to all businesses. In this respect, efficient, 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 available to establish the direct role of telecommunications pricing in technological and service innovation. Other factors, such as customer demands, competitive pressures, technological developments and regulatory requirements have played a significant and possibly greater role.

4.5 Contributing to overall economic efficiency

4.5.1 The costing and pricing of telecommunications services

In the view of traditional mainstream economists, economically efficient pricing occurs when prices are set equal to marginal costs. Setting the price of a good equal to its marginal cost ensures that additional units of a good are produced if and only if the value of the additional unit is at least as great as the value of the inputs used in its

production. Where price is established in excess of marginal cost, consumption is discouraged even when the value attached to additional production exceeds its cost. Where price is set below marginal cost, excessive consumption is encouraged. In total, the application of marginal-cost pricing leads to the net value of society's output being maximized.

Opponents dispute marginal-cost pricing on several grounds. First, they argue that prices for some services should be lowered to promote availability to low-income or other individuals, or to promote utilization. Countering this view, many economists argue that the governmental tax and expenditure system is more appropriate to promote such ends. Secondly, it is argued that some goods used by one set of individuals create value for others - called externalities - and that in these circumstances, economically efficient pricing requires that price should be set below marginal cost. Traditional economists, however, tend to doubt the widespread existence of externalities of any significant magnitude. Thirdly, it is argued that in industries without constant unit costs, marginal-cost pricing will lead to excessive profits or losses and, for regulated utilities, is unlikely to yield revenues equal to the revenue requirement calculated by the regulator. While proponents of marginal-cost pricing concede this difficulty, they maintain that economic pricing 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, it is argued that marginal-cost pricing is not operational and should be ignored because of the practical difficulties in calculating marginal costs.

One widely held view, typified by Alfred Kahn, internationally recognized for his work in the area of regulatory economics, holds that telecommunications services depart from marginal-cost pricing with consequent lessening of economic efficiency. Kahn asserts that telecommunications rates are averaged with respect to factors such as geography and that this can result in rates in specific locations, or for specific users, that differ from underlying costs and thus lessen economic efficiency. He also states that long-distance telephone 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. Finally, he states that within the local rate structure, the failure to charge for local service on a usage basis leads to excessive local calling.

Kahn argues that an efficient telecommunications 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 with the system. The second charge would vary with usage, for example, call duration or time of day.

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 finding in Case No. U-1500-153, Order No. 20182, December 1985 that 50 per cent of access costs should be recovered from local service with 25 per cent being recovered from each of inter-state and intra-state long-distance service. Relative to being adopted in Canada, the modified five-way split cost evidence of Bell Canada and B.C. Tel indicates that, in their cases, less than one-third of access costs are currently being recovered through local rates. Disagreement exists, however, as to the appropriateness of the five-way split methodology and, hence, the accuracy of such estimates.

With regard to Kahn's position on measured-rate local pricing, a recent Rand Corporation research report concluded that measured-rate pricing of local telephone calls is likely to be somewhat less efficient than traditional flat-rate pricing.

4.5.2 Macroeconomic impacts of telecommunications price changes

A number of studies have been conducted in Canada and the US in recent years that estimate the impact of telecommunications price changes on the economy as a whole. Underlying these studies are a number of quantitative assumptions including, in particular, those respecting marginal costs and the price elasticity of demand for telecommunications services. In the absence of fuller knowledge as to the reasonableness of such assumptions, the specific results produced by these studies should be considered with caution. Nevertheless, summaries of the studies are included to provide an indication of available estimates of the economic impacts of telecommunications price changes.

The economic model of Informetrica Limited, of Ottawa, has been used on two occasions to estimate the macroeconomic effects of telecommunications price changes. Their 1984 study for Bell Canada

assessed the impacts of a rate restructuring plan that 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 period. It estimated that such a rate restructuring would result in a $2 billion (approximately 0.5 per cent) annual increase in real Gross National Product (GNP) by 1989 (1983 dollars). It also estimated that the average price of telecommunications services would be 11 per cent lower by 1989 - 10.3 per cent higher for residential subscribers and 22 per cent lower for business subscribers. In terms of Canada's trading position, exports would rise by $83 million (approximately 0.02 per cent) over the five-year period and imports would rise by $296 million (approximately 0.08 per cent). Since the exchange rate was constrained in the analysis, this decline in net trade indicates the stimulation effect of rate changes rather than a deterioration in competitiveness.

The Informetrica model was also used in the 1986 study by D.A. Ford and Associates referred to earlier to determine the effects of lowering Canadian telecommunications rates paid by business to US levels. A staff analysis of the study found that lowering Canadian rates for business telecommunications services to US levels would imply an average reduction of approximately 13 per cent in such rates. The study concluded that such adoption of US rates would lead to increases in Gross National Expenditures ranging from $139 million (approximately 0.08 per cent) in 1986 to $385 million (approximately 0.2 per cent) in 1990 (1971 dollars). A small positive effect on exports would result, while imports would be scarcely affected. In interpreting these results, however, it must be specified that the estimates in the Ford study do not take into account negative effects on the economy of the rate increases or other measures that would be necessary to offset the effects on telephone company revenues of lower rates to business subscribers. The economic effects of a set of self-financing rate changes thus cannot be inferred from the study.

A 1984 study undertaken by Peat, Marwick and Partners for federal and provincial governments used consumer surplus as a measure of the economic impact of telecommunications rate changes. The study considered across-the-board long-distance rate reductions of 10 per cent, 20 per cent 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 these reductions in long-distance rates would, for each province and for Canada as a whole, be greater than

the decline in consumer surplus caused by the accompanying increase in local rates. The explanation for this phenomenon lies in the difference between the elasticity of demand for long-distance services as compared with that for local services. In other words, it was assumed that the sensitivity of demand to changes in price is lower for local service than for long-distance service. The study found, for example, that the consumer surplus corresponding to a 40 per cent across-the board long-distance rate reduction across Canada would be $685 million per year in 1982.

Similar results have been obtained by US studies of telecommunications rate changes. A study in 1984 by Wharton Econometric Forecasting Associates predicted that a 10 per cent reduction in long-distance rates (with no offsetting increase to local rates) would increase real US GNP over the period from 1984 to 1993 by $71 billion (1972 US dollars). Net real merchandise exports would increase by $6.7 billion. Similar results to those of Peat Marwick have been arrived at by the US National Telecommunications and Information Administration (NTIA) in their comments in Federal Communications Commission CC Docket 80-286. NTIA concluded that an annual consumer surplus gain of $1.6 billion (1981 US dollars) would be generated by shifting the recovery of all access costs to local rates.

4.5.3 Assessment

A number of differing approaches to the costing and pricing of telecommunications services relative to contributing to overall economic efficiency have been reviewed. Additionally, a number of studies that explore the macroeconomic impacts of telecommunications rate changes have been summarized. 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.

5.0 MEASURES TO ALLEVIATE POTENTIAL ADVERSE EFFECTS OF CURRENT AND ALTERNATIVE TELEPHONE SERVICE PRICING

This chapter explores measures to alleviate the potential adverse effects of current and alternative telephone service pricing. One of the key areas discussed concerns measures to counter any potential threats to the universal availability of affordable telephone service that might arise as a result of adopting alternative rate structures. These measures are also discussed in the context of being available to improve current levels of telephone service availability and affordability should that be judged desirable. A second area discussed involves measures to establish prices more in line with the user-pay concept, and to reduce the economic inefficiencies which some have argued are created by current rating principles and practices. Before they could be implemented in specific jurisdictions, however, a review of their legality would be necessary. More details can be found in Chapter 10 of the Working Papers.

5.1 Measures to maintain or improve universal availability of affordable telephone service

This section addresses measures which could be undertaken by the telephone companies or by governments to offset any reduction in the affordability of telephone service or levels of subscribership resulting from significant increases to local rates. These measures could also be adopted to further decrease the number of households that currently do not subscribe to telephone service. In this respect, as noted earlier, in some geographical areas and among some age and income groups, telephone service penetration is significantly less than the national average.

5.1.1 Directed subsidization of telephone service

One option available for policy consideration relative to maintaining or improving the availability of affordable of telephone service is directed subsidization to individuals or regions. Measures that assist individuals who need specific help and/or target specific regions where the provision of telephone service is difficult and expensive are discussed below.

Directed subsidization to individuals

The directed subsidization of individuals may be done in two ways:

1) the provision of lifeline services by the telephone companies; and

2) support for or reimbursement of the costs of service by governments.

Lifeline services involve the provision of service to individuals at special rates (i.e. rates lower than those charged to the general subscriber body). Generally, such services would be provided to people who meet a specified means test relating to such factors as household income and also, possibly, age or physical handicap.

Implementation of lifeline services in Canada would require the establishment of levels of service and the rates to be paid by qualified individuals. In a flat-rate local environment, service levels could vary from single-party, to two-party, to multi-party service with rates dependent on individual ability to pay or general economic circumstances. In a local measured service environment, services could be defined by an appropriate free call allowance and reduced access and/or usage rates.

The revenue loss to the telephone companies from providing services at rates lower than the general level could be recovered in one or more of the following ways:

- a charge levied on all other subscribers;
- a surcharge on certain users, such as long-distance users; and
- reimbursement by governments, with funding from government revenues.

It can be argued that subscribers in general benefit from maximizing access to the telephone network and, hence, the general body of subscribers should bear the costs for the few who are disadvantaged. Alternatively, it can be argued that the benefits received by long-distance users as a result of rate restructuring should be used to offset any dislocations which it might cause. In an environment in which telephone service is close to being universally available, reimbursement by governments could be considered both fair and efficient.

Such reimbursement by governments would function on the basis of a periodic identification by the telephone companies of revenue differentials from lifeline services and the collection of necessary funds from appropriate governments. With this cost-recovery mechanism, citizens in general would bear the burden of providing service to the disadvantaged.

In the second method of directed subsidization of individuals, the telephone companies would play no role; instead, the subsidization would be done directly 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 persons in need. This program could utilize the existing system of social assistance for determining eligibility criteria and program delivery. In fact, most provinces and territories already have some form of telephone allowance under the Canada Assistance Plan which could be used as the basis for an expanded program. A major disadvantage of granting a telephone subsidy via existing social assistance programs is that these programs may not be able to reach all those seriously affected by higher telephone rates - for example, the working poor. However, this disadvantage could be outweighed by the costs of implementing a telephone subsidy by other means.

An alternative method of assistance available to governments is through the tax system: A telephone tax credit could be designed to be administered through the income tax system to provide assistance to low- and middle-income families in meeting the costs of rising local rates. This system would apply more widely than existing assistance programs. However, such a tax mechanism would provide a refund only once a year and would not necessarily be perceived as relating to local telephone service costs. Furthermore, if telephone service were not to be affordable for some individuals on a monthly basis, a once-a-year subsidy might not be effective.

Directed subsidization to telephone companies

An alternative method of maintaining or improving availability of affordable telephone service is direct government support to telephone companies to provide or improve service in selected geographical areas. Support programs of this nature have been used on occasion in the past. Examples are presented in Chapter 10 of the Working Papers.

5.1.2 Non-directed means of ensuring universal availability

Low cost, non-directed publicly available budget services provide a means of overcoming the administrative and other problems of some of the directed subsidies discussed above. Options include two-party or multi-party services priced at budget rates (currently offered in some jurisdictions), budget pay telephone service at selected locations, and the implementation of local measured service, possibly with a low-use measured-service option.

If it is desired to assist low-income subscribers, non-targetted discount services are not an efficient means since such services are also available to affluent subscribers. In this respect, non-targetted discount services could be an expensive and wasteful means of ensuring universal availability of affordable telephone service.

5.2 Economic efficiency and the user-pay concept in telephone service rate structures

It is argued by some that economic inefficiencies may exist as a result of current telephone service pricing. Specifically, these inefficiencies are said to exist because of departures from marginal-cost pricing: the first, relative to the current method of recovering non-traffic sensitive costs from local and long-distance services, and the second in respect of flat-rate local pricing. Additionally, the point has been raised that company-wide rate averaging and value-of-service pricing can give rise to situations where the rates for specific services do not necessarily recover related costs. In this respect, pricing may depart from the user-pay concept.

Alternative rate structures that can potentially address these matters were presented in section 3.3. There is considerable disagreement over the methods by which to improve economic efficiency and promote the user-pay concept. Possible methods include the recovery of access costs on a flat-rate basis, compressing local rate groups, eliminating or reducing residential/business local rate differentials and the introduction of LMS.

6.0 SUMMARY AND CONCLUSIONS

The report has reviewed current telecommunications rating principles and practices, and identified and analysed possible alternative rating structures. The latter analysis was primarily concerned with the impact of changed long-distance telephone rates on local telephone service rates, but also included a general discussion of restructuring both long-distance and local rates. In addition, various measures were identified to alleviate the potential adverse effects of current and alternative pricing systems.

Whereas similar telecommunications rating principles and practices have been adopted across Canada, it was noted that rate levels for local and intra-company long-distance telephone services vary considerably from company to company. However, rates for inter-company long-distance services, with some exceptions, are quite similar.

Impacts on local telephone service rate levels were estimated for each province as a consequence of changes to long-distance rates. For example, it was found that lowering inter-provincial and intra-provincial long-distance rates across the country by 10 per cent would result in residential local rate increases ranging from 10.5 per cent to 22.4 per cent, depending on the province. This would constitute actual dollar increases ranging from $1.15 to $2.13 per month. Alternatively, lowering inter-provincial rates by 50 per cent and intra-provincial rates by 20 per cent would result in local rate increases ranging from 44.5 per cent to 108.5 per cent and actual dollar increases ranging from $4.88 to $10.66. The same analysis was carried out for local business rates.

An analysis of average monthly bills associated with the reductions in inter-provincial and intra-provincial long-distance rates and the local rate increases discussed above predicted that average monthly residential bills would change very little from current averages. Whereas the average residential bill in most provinces would remain largely unchanged, the majority of residential subscribers would experience some bill increases, except in Bell Canada territory. The distribution of effects was such that a small number of bills were predicted to decrease by comparatively large amounts and a larger number were predicted to increase by a small amount. For example, in the case of 10 per cent reductions to inter-provincial and intra-provincial rates,

the majority of bills were predicted to change by less than $5.00. Depending on the province, 4.2 per cent to 9.7 per cent of monthly bills were estimated to decrease by more than $5.00 and no bills were predicted to increase by more than $5.00. In the case of a 50 per cent reduction to inter-provincial long-distance rates and a 20 per cent reduction to intra-provincial rates, larger percentages of monthly bills were predicted to decrease or increase by more than $5.00. Estimated decreases in a small number of bills could be greater than $100.00 per month; alternatively, no bills in any province were predicted to increase by more than $15.00 per month.

The analysis of average monthly bills also predicted that business customers generally would experience reduced average bills. This would not, however, be the case in all provinces or for all types of customers.

The report investigated rate restructuring within both local and long-distance services. Alternatives outlined include: for local services, compressing the number of rate groups, reducing or eliminating residence/business rate differentials, creating a separate rate for access, introducing local measured service; and, for long-distance services, altering the distance dependence of rates, altering the rate relationship between substitutable services, changing existing or introducing new time-related discounts. It was noted that such rate restructuring alternatives could increase or decrease the effects on some subscribers of the long-distance/local rate changes discussed.

Statistics on telephone service penetration levels indicate that Canada has one of the highest levels in the world - 98.2 per cent of Canadian households subscribed to telephone service in 1985. The report contends, based on the best evidence available to date, including a statistical model developed by staff, that increased local rates would be unlikely to result in any significant reduction to telephone service penetration levels, even for price increases of as much as 100 per cent. This position differs markedly from previous statements made by a number of parties that penetration levels would be seriously affected.

The current extent of bypass of telecommunications carriers' facilities, both domestically and internationally, was found to be minimal. Bypass is deterred by current pricing principles and practices as well as by the radio spectrum licensing, interconnection and other policies of the federal and provincial governments, and by Canada-US exchange rate differentials. Removal of some or all of these deterrents could, the report noted, result in increased bypass activities in Canada.

Available evidence indicated that telecommunications costs for Canadian businesses are, on average, a relatively small portion of the total costs of doing business. Furthermore, surveys of Canadian businesses indicated that most businesses consider telecommunications costs to be relatively unimportant (a) in terms of Canada as a place to do business and (b) in terms of their international competitiveness. Hence, it was concluded that telecommunications rate changes would have only small impacts on the overall cost structure and performance of Canadian business, in domestic as well as international terms.

It was observed, however, that many companies devoted a larger share of their input expenditures to telecommunications services than the average. Information-intensive Canadian businesses or those competing directly with US counterparts having lower long-distance costs could be affected most by rate restructuring.

It has been suggested that more effective use of the telephone network could potentially be achieved by rating changes - for example, through time-related discounts - which distribute demand and, hence, the use of resources, from peak to off-peak periods. More effective use may also be fostered by the utilization of network capabilities, which might otherwise lie idle or not be developed, to provide new services to the public and new revenues for the industry.

A number of differing approaches to the costing and pricing of telecommunications services relative to contributing to overall economic efficiency have been outlined. A number of studies that explore the macroeconomic impacts of telecommunications rate changes were summarized. 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.

Finally, various measures to alleviate the potential adverse effects of current and alternative rating principles and practices were outlined. Alternative measures to maintain or improve the availability of affordable telephone service include lifeline services, government assistance to individuals or to telephone companies and budget services. Rating changes to promote economic efficiency and the user-pay concept in rate structures were also discussed.

APPENDIX A
LIST OF MEMBERS OF THE EXAMINATION

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

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. Demers
Régisseur
Régie des services publics du Québec

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

Mr. A. Ackroyd
Chairman
Alberta Public Utilities Board

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

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

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

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

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

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

APPENDIX B
WORKING PAPER CHAPTER TITLES

CHAPTER 1 - Overview of the Examination, the Telecommunications Industry and its Regulatory Structure

CHAPTER 2 - Local and Long-Distance Rating Principles and Practices

CHAPTER 3 - Alternative Long-Distance and Local Rates

CHAPTER 4 - Effects of Current and Alternative Rate Structures on Maintaining Universal Availability of Affordable Telephone Service

CHAPTER 5 - Effects of Telephone Company Rates on Avoiding Uneconomic Bypass

CHAPTER 6 - Effects of Current and Alternative Rate Structures on Fostering Effective Use of the Public Telecommunications Network

CHAPTER 7 - Effects of Telecommunication Rates on Facilitating Cost-Effective Business Communications and Encouraging Technological and Service Innovation

CHAPTER 8 - Telecommunication Costs and the Overall Economic Impact of Alternative Rate Structures

CHAPTER 9 - Effects of Rate Changes on Subscriber Bills

CHAPTER 10 - Measures to Alleviate the Potential Adverse Effects of Current and Alternative Pricing Systems

CHAPTER 11 - Effects of Changing Telecommunications Technology on Present and Alternative Local and Long-Distance Rate Structures