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Analysis of
Social, Economic and Regulatory
Impacts
of
Restructuring
the Canadian Telecommunications Industry
by
Maurice Estabrooks

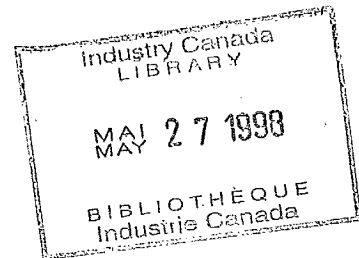
Financial and Regulatory Affairs Directorate
Department of Communications
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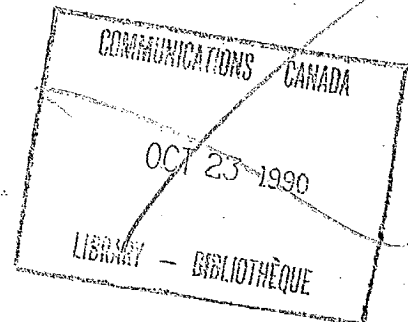
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PART I: INTRODUCTION

1. Background

Enormous technological, industrial, economic and political forces are at work to restructure the Canadian telecommunications industry. As in the United States, this pressure stems from major technological changes affecting not only telecommunications but every other industry in the economy, from the business community demanding better quality, more efficient and cost-effective telecommunications services, from potential entrants and new competitors seeking a share of an emerging high growth sector and from the telecommunications industry itself in its desire to respond to new threats and opportunities. Political pressure is also mounting to accommodate these forces and various industrial, regulatory and social policies have been suggested to effectively deal with them. General deregulatory or reregulatory policies include introducing more competition and greater incentives to accommodate change.

Canadian businesses are concerned that without changes, they will be left in a position in which they will be unable to compete internationally. The Canadian telecommunications industry is concerned about the potential for international carriers to bypass Canadian networks and of their own ability and regulatory freedom to compete fairly under existing rate structures. Unions in the telecommunications industry are concerned about being losers in what they perceive as deregulation of the industry. The Canadian public is concerned about the impacts of these forces on local telephone rates, particularly the threat of significant increases in local rates which

could threaten the continuation of affordable universal public telephone service to the poor, disabled and elderly. In general, the public also wants the benefits of lower telephone rates, particularly long distance rates although some regions and rural areas may be adversely affected in the short run.

In Canada, two major applications or proposals to restructure the Canadian telecommunications industry were presented to the CRTC. The first was an application by CNCP in October of 1983 seeking permission for CNCP to offer long distance public telephone service competitively with the telephone carriers. The second was a proposal by Bell Canada in April of 1984 to rebalance the rates for local and long distance public telephone services to bring rates more in line with their costs before competition was considered.

In August of 1985, the CRTC rejected both the CNCP and Bell Canada proposals (CRTC Telecom Decision 85-19). In its decision, the Commission recognized that major public benefits would result from either the introduction of competition or lower long distance rates. Implicit in the Commission's decision, however, is the fact that neither rate restructuring nor the eventual introduction of competition can be ruled out. Indeed, it appears that the appropriate decisions have only been delayed. In its decision, the Commission stated its intention of holding a public process into the whole issue of rate making in public telecommunications services.

This report represents an assessment from a public policy view of the meaning and significance of restructuring the telecommunications industry and its social, economic and regulatory impacts, together with an in-depth economic study of the impacts of restructuring the Canadian telecommunications industry along the lines proposed by CNCP and Bell Canada. As such, it represents a review not only of the fundamentals of public utility regulation but of methodologies appropriate for public policy analysis, a description of the likely impacts of

restructuring, and an analysis of the various impact studies done to date, a comparison and critique of these studies and proposals for further study.

2. Purpose and Objectives of Report

The purpose of this report is as follows:

- a) To describe the forces and pressures building up to restructure the Canadian Telecommunications Industry;
- b) To assess the meaning and significance of restructuring the industry;
- c) To analyse various proposals to restructure the industry and the CRTC Decision;
- d) To assess regulatory policies pertinent to further restructuring the industry;
- e) To describe the various approaches and methodologies for assessing the economic impacts of restructuring the industry;
- f) To describe, assess and compare the results of the Peat Marwick, CNCP-DRI and Bell Canada - Informetrica studies which attempt to quantify the macroeconomic and microeconomic impacts of restructuring;
- g) To describe the strengths and weakness of various methodologies, and finally;
- h) To propose other directions for research for assessing developments and impacts of the changing telecommunications industry on social, industrial and economic development.

3. Assessment of Technological, Economic and Political Factors

The Canadian telecommunications industry is in a period of transition brought about by a wide variety of factors of a technological, structural, international and government policy nature.

Technological developments in new transmission and switching systems, the integration of digital computer and telecommunications technologies, complemented by profound changes in the demand in the variety, quality, efficiency and price of telecommunications services, have attracted entry on an increasingly broad front particularly in the U.S. but in Canada as well.

Telecommunications services and equipment have become an increasingly important factor in the production of goods and services in most industries, particularly since the new technology offers considerable scope for productivity improvement, the development of new and more innovative services, better quality services and greater efficiency. This comes at a time when Canadian industry is seeking sources new strategic sources for improving their competitive position in international markets. Telecommunications is one of the more important sources of competitiveness for businesses and this is the major reason telecommunications services and equipment represent a growth market.

In the United States, the Federal Communications Commission has proceeded relentlessly to enforce a policy of deregulation culminating recently with the break-up of the Bell System particularly as a means of satisfying the many demands placed on it as well as to reduce concentration in the industry and introduce more competition.

In concert with the revolution in telecommunications technology, new equipment and new carriage services, and with the growing competitive pressures in the United States, the issue of bypass is becoming increasingly important. Bypass refers to the growing

alternatives to traditional telecommunications services particularly those which can be provided more cost-effectively or of significantly better quality with new technology such as digital switching or fiber optic transmission systems. Bypass poses a threat in one way or another not only to long distance but to local public telephone service as well. Bypass could be a significantly more serious threat to Canadian carriers than U.S. ones because of the ease and cost-effectiveness of bypassing the Canadian public telephone network entirely by U.S. carriers which need only to extend their networks near the Canada-U.S. border several hundred miles to Canada's largest cities.

The Canadian telecommunications establishment is besieged by one group to follow the lead of the U.S. while another group is of the view that the costs of importing a U.S. solution are just too great for Canadians.

It can be argued that major restructuring of the Canadian telecommunication industry is not only inevitable but that some forms of restructuring would benefit the industry and the public. Furthermore, attempts to blunt or thwart those powerful forces and delay any form of restructuring will ultimately fail but they could be costly to business, the public and the industry as well.

A major cause of the current dilemma facing regulators and governments responsible for the development and administration of the effective operation of the telecommunications industry as a public utility is that the public utility model is essentially a static one. It cannot cope with change because all of the major players either find it in their interests to maintain the status quo, or they cannot agree which direction changes should take or the speed of change. What is required is a dynamic public utility model, one which responds automatically to the many changes such as those described above. For most of these forces for change are essentially good for the public.

The new technologies on the horizon are undoubtedly beneficial for the public for they will result in more efficient, cost effective and better quality telecommunications services. But before these are achieved, the telecommunications industry and the public utility model must be restructured.

PART II: REGULATORY POLICY ASSESSMENT

4. The Meaning and Significance of Restructuring the Canadian Telecommunications Industry

Historically, the Canadian telecommunications industry qualifies as a regulated public utility. There are at least five basic elements of the regulated public utility model. These are:

- a) a government regulated privately-owned (or government-owned) natural monopoly supplier of all services, i.e., providing end-to-end service, terminal equipment, local and long distance telephone service, etc.;
- b) value-of-service pricing in which the pricing of services is derived not from costs but from the perceived value of services, i.e., rates are set to achieve social equity goals rather than efficiency goals and major implicit patterns of cross-subsidy exist among customer classes and service classes. For this reason, until recently there has never been a need to develop detailed costing methodologies and accounting procedures from which costs on a customer or service basis could be calculated;
- c) universal public telephone service in which local public telephone rates are kept very low so that every household, independent of income, can afford and indeed is encouraged to subscribe to the service, thereby maximizing the value of the service and the utility to society;
- d) obligation to serve in which the monopoly supplier is obliged to serve all customers at certain minimum high standards of quality independent of cost as part of the supplier's public responsibilities as a protected monopolist;

- e) guaranteed rate of return on capital investment in which the carrier supplier is guaranteed a normal rate of return on all invested capital after adequate provision for other costs and expenses. Allowed rates of return to capital must be sufficient to enable the company to raise financing in the capital market as well as to compensate shareholders for their investment;

- f) rate setting in which the carrier supplier files with the regulatory Commission (empowered to ensure that the public obligations of the carrier are met) for revisions of tariffs adequate to cover all costs, expenses and including a normal return on investment.

It is important to note that these form a relatively complete and consistent set of principles that underly the model of the regulated public utility and that if we drop any one of them, the others may be adversely affected. For example, if we introduce competition, the principles of value-of-service rate making, universality of service and obligation to serve could suffer. Also if we drop the value-of-service principles and adopt cost-based principles for rate making, then the principle of universal affordable public telephone service could suffer. In conclusion, perhaps even minor changes to the model of the regulated public utility, i.e., any form of restructuring, could destroy the whole model.

The Canadian telecommunications industry has changed with the times guided by public and regulatory policies exercised by the Canadian Radio-television and Telecommunications Commission. Until 1985, the status of the various segments of the industry and extent of regulation was as follows:

- a) Public telephone services including local and toll telephone services, WATS, and certain private line services connected to

the public switched telephone network have been regulated monopoly services offered only by the members of Telecom Canada;

- b) Private line services not connected to the public telephone network are competitive in nature being offered by Telecom Canada and CNCP Telecommunications;
- c) Public data services connected to the public switched telephone network as well as those not connected to the public switched telephone network are in the competitive segment of the industry. CNCP received the right to interconnect its facilities to Bell Canada's local exchange telephone system for supplying interexchange private line voice service and public data services in 1979 (Telecom Decision CRTC 79-11).
- d) Customer premises equipment which includes telephone and computer terminal equipment together with certain switching equipment and inside wiring have been deregulated and are supplied competitively. In a series of decisions, commencing with Telecom Decision CRTC 80-XX, the CRTC began to dismantle many of the regulations dealing with ownership and supply and tariffication of customer premises equipment.
- e) Enhanced services (Resale and Sharing) in which special carriers wishing to offer special value-added services to those transmission or switching facilities and services offered by the telephone companies are able to lease bulk facilities at reduced rates from these carriers and offer these services to the public. In Telecom Decision CRTC 84-18 (12 July, 1984) the CRTC required all federally regulated carriers to permit resale and sharing for the purpose of providing enhanced services.

Considerable pressure began building in 1984 to make further changes in the structure and regulation of telecommunications services in Canada in what is described in this report as proposals to restructure the Canadian telecommunications industry. These proposals relate to the scope of competition, the nature of regulation, the pricing of telecommunications services, the allocation of costs, and so on. These proposals are directed at the heart of the model of the regulated public utility and affect such widely held and desirable public policy goals as efficiency, innovation, technological change and the achievement of universal public telephone service.

These proposals for restructuring the Canadian telecommunications industry fall into many categories and include public telephone voice and non-voice services, public local telephone and public toll telephone services, rate restructuring, rate rebalancing and competition, interconnection with the local public telephone switch and resale and sharing of facilities and services.

The major proposals for restructuring the Canadian telecommunications industry are as follows:

- a) Rate restructuring of local and/or toll public telephone services in which such rate-making principles as route averaging, nation-wide averaging and value-of-service pricing principles are abandoned in favor of cost-of-service principles. In the provision of local services, this could mean that local measured service pricing based on costs would be instituted.
- b) Rebalancing of rates between local and toll telephone services in which the rates of local public telephone services would increase to be more in line with their costs and those of toll services reduced to be in line with their costs. Although no costing methodologies have yet been agreed upon, telephone companies estimate that rebalancing could double local rates.

- c) Competition in the provision of long distance public telephone services such as MTS and WATS. Such competition would require the interconnection of competing long distance networks to the local public switched telephone network of the major carriers and could result in a major drop in toll revenues probably with the necessity to offset this decline by increases in local rates. This in turn could have an adverse effect on universal service.

- d) Competition in the supply of non-public telephone services such as shared private line services. This would constitute an approval by the CRTC to remove the restrictions on the telephone carriers which prohibit the resale and sharing of telecommunications facilities and services.

- e) Competition in the supply of local public telephone services. It is generally agreed that the local public telephone network is a natural monopoly for which no direct substitute is currently feasible or expected to be feasible in the near future (except to duplicate the network which is probably uneconomic). Competition in the provision of local public telephone services is therefore not feasible or desirable and no proposals have been made for this purpose. However, several possibilities exist which could constitute implicit competition, i.e., through facilities which effectively bypass the local network. For example, it is feasible and perhaps cost-effective to build a network to serve the largest businesses in an urban area which would bypass the telephone network altogether. To the extent that this diverted traffic from the public telephone network, it would constitute competition in the supply of local telephone services and could adversely affect the financial viability of public telephone services.

- f) Interconnection of private networks with the local public telephone network is another means of restructuring the telecommunications industry. As far as voice services are concerned, this would constitute a form of competition in local public telephone service and could reduce the carriers' local telephone service revenues. But interconnection can also take place only for the provision of non-voice services such as data transmission, public message and public data and computer communications, etc., without having an adverse impact on the viability of voice services. As long as certain technical standards and service quality can be achieved, this could be in the public interest.

Various other options and alternatives for restructuring the Canadian telecommunications industry can be suggested to complement those already identified. These include the separation of local and toll services supply, the separation of carriage, i.e., transmission and switching, from the provision of information services, and possibly even vertical integration. These issues we have chosen to exclude from this assessment.

5. Assessment of Regulatory and Policy Alternatives and Impacts

Restructuring the Canadian telecommunications industry could have an enormous economic and social impact, impacts that we shall deal with later in this report. But is it the regulatory impacts that are of major concern in this section the report. The various realities relating to regulatory impacts are described and outlined below.

In the absence of explicit regulatory or policy initiatives, it is likely that adverse regulatory and economic impacts are likely to occur which will increase pressures for change. Perhaps the most significant is the potential for bypass and the incumbent effects on universal service and the business community in general.

To accommodate the proposed changes, there is a set of regulatory and policy exigencies which appear appropriate to the situation facing the telecommunications industry as a public utility. A satisfactory regulatory policy should consist of the following:

- a) an effective means of maintaining a form of universal public telephone service;
- b) an effective means to separate competitive and monopolistic segments of the industry which recognizes technological, economic, industrial and regulatory realities;
- c) an effective means to ensure fairness of competition and absence of cross-subsidization of competitive from monopoly services;
- d) an effective cost allocation formula that can be used to cost out services, allocate common costs, and ensure fairness in the provision of competitive and monopoly services;
- e) an effective system of cost-based rates for competitive services as well as certain monopoly services;
- f) changes in the regulatory utility model which recognize the obligation to serve in monopoly segments of the industry while abandoning it in the competitive segment;
- g) changes in the regulatory model which provide incentives to invest and take advantage of new opportunities, to develop and market new innovative services, (i.e., to respond to changes in demand by business and residential users alike);
- h) incentives for superior performance, risk taking, efficient management and efficiency of resource allocation in the company and in the industry.

It is clear that complete deregulation of the telecommunications industry in Canada or elsewhere is neither feasible nor in the public interest. Efforts to do so over several decades have served to introduce some competition in the United States but regulations are still necessary either to ensure that some competition is maintained, or in its absence, that monopolistic competition does serve the public interest.

However, a new regulatory model must be derived along the lines suggested above. This model should be flexible, innovative, incentive-based and fair while meeting certain minimum basic public policy objectives such as those described above.

6. Related Proposals Presented to the CRTC

In 1983 and 1984, two important proposals were filed with the CRTC relating to the restructuring of the Canadian telecommunications industry.

The first was the CNCP application, filed with the CRTC in October of 1983. CNCP was seeking permission "to compete in the supply of long distance public telephone service within and between the areas served by Bell Canada and B.C. Telephone ... [and to] provide long distance telephone service to the United States and overseas". Approval of this application would "permit customers [of B.C. Telephone and Bell Canada] to call into the existing CNCP long distance network from their home or office phones and then use the CNCP network to carry their calls between cities". According to CNCP, "Users of CNCP's long distance public telephone service will realize savings of up to 30 percent on current telephone company rates".¹

Bell Canada countered the CNCP application with a proposal of its own. In April of 1984, Bell Canada filed a proposal with the CRTC, to rebalance the rates of local and long distance telephone services

before competition in long distance services was considered. Bell's proposal was rationalized as follows. It is a widely held view that local telephone rates are held substantially below their cost of provision, while the rates for toll telephone services are set substantially above their costs. This means that toll services revenues are subsidizing local services but it also means that the high margins in toll are attracting companies like CNCP to enter seeking profits. To curb this incentive to enter the toll business, Bell Canada has proposed to raise local rates by as much as 175% and lower toll rates by 60%. i.e., thereby eliminating the "disparity" between costs and prices in the provision of both local and toll telephone service.

In January of 1984, the CRTC announced a proceeding to deal with the CNCP application and to determine whether further entry into the interexchange market should be permitted. The Commission also invited comments on two other issues. The first related to whether or not competition should be allowed through the resale and sharing of carrier services and facilities. The second was the interconnection of non-carrier local network facilities with carrier facilities used to provide both long distance and local telephone services.

7. Review of the CRTC's Decision (not) to Restructure the Canadian Telecommunications Industry

The CNCP application represented the first major opportunity to restructure the Canadian Telecommunications Industry. In August, 1985, the CRTC issued its decision on the case (Telecom Decision CRTC 85-19), entitled "Interexchange Competition and Related Issues". This decision related to: a) the benefits of competition in the provision of long distance public telephone service, b) the CNCP application, c) the rate rebalancing proposal of Bell Canada, d) the resale and sharing of services, and e) the interconnection of local systems to the local public switched telephone network.

The CRTC concluded that it would not be in the public interest to approve CNCP's application although it did find that a number of benefits could potentially result from competition in the provision of long distance public telephone service. The Commission did not seem to rule out the eventual introduction of competition in this segment of the industry, however.

Regarding Bell Canada's rate rebalancing proposal, the Commission rejected the proposal on the grounds that the resulting potential increase in average local rates of between 100 and 200 percent is not necessary or desirable in the public interest. It did conclude, however, that existing MTS and WATS rates are substantially in excess of costs and that a lowering of such rates is necessary to reduce communications costs to business, to prevent bypass of Canadian networks and to stimulate investment and economic activity generally.

As a result of these findings, the Commission stated its intention of initiating a "public process to consider the extent of the MTS/WATS rate reductions required, the way and time period over which they should be achieved, and the methods that should be employed to ensure that any resultant increases to local rates do not jeopardize the principle of universal accessibility to telephone service at an affordable price". In addition, the Commission put a freeze on the aggregate level of Bell's and B.C. Tel's MTS/WATS rates.

It is interesting to note that regarding competition in MTS/WATS services, the Commission has, on the one hand, denied the CNCP application while, on the other hand, it has not ruled out competition, and regarding rate rebalancing, the Commission has denied the Bell Canada proposal, on the one hand, while it has not ruled out the eventual rebalancing of rates, on the other. Indeed, the Commission seems to have adopted the principles of competition in public toll telephone service and rate rebalancing and at the same time rejected proposals which would accomplish these goals exactly. This is a remarkable feat for the Commission.

Telecom Decision CRTC 85-19 did, however, considerably increase the scope of competition in other segments of the industry, specifically the resale and sharing segment and the interconnection of local systems.

Regarding resale and sharing of carrier services and facilities, the Commission found that liberalizing regulations would result in such benefits as greater efficiency and supplier responsiveness as well as lower and more flexible rate structures except where this could increase the costs to the existing carriers. Based on these findings the Commission decided to permit the sharing of message toll services, to permit the resale and sharing of long distance facilities and services other than long distance public telephone services (but only after carriers are permitted to restructure their rates for such services) and to permit the resale and sharing of local services except in the case of resale to provide basic local telephone service. Furthermore, the Commission found that it would neither be necessary or desirable to regulate the activities of resellers and sharers. Thus the Commission removed regulations regarding the resale and sharing of facilities and services except where they could adversely affect public telephone services.

The Commission went one step further in Telecom Decision 85-19 by expanding the scope of the competitive segment of the telecommunications industry. It concluded that it would be desirable to permit the interconnection of private local network facilities and public non-voice network facilities to carrier facilities because this would facilitate the development of a responsive and innovative computer communications infrastructure and opportunities in emerging high technology markets. It also proposed not to regulate the rates for this type of interconnection although technical standards would be developed for such interconnection.

These aspects of Telecom Decision CRTC 85-19 dealing with resale and sharing and local network interconnection are very important for the future of the telecommunications industry because it offers major new potentially high growth areas for Canadian suppliers and because these new services will probably have a major impact on the business community.

In summary, Telecom Decision 85-19 may be seen as a decision to delay the restructuring of a significant, indeed, the largest segment of the Canadian telecommunication industry, and as such, the impacts of competition and rate restructuring as they relate to public telephone service, are as important as they were before the announcement of the Commission's decision. Looked upon in a different light, the Commission's decision, seen as a statement of the inevitability of restructuring the Canadian telecommunications industry, make it even more important to assess the impacts of restructuring the public telephone segment of the telecommunications industry.

PART III: ECONOMIC ASSESSMENT

8. Methodology for Public Policy Analysis

An assessment of the impacts of the CNCP application and the Bell Canada rebalancing proposal is a very important part of policy analysis and there are various ways of performing an impact analysis. There are basically two approaches to such an assessment: quantitative methods which make use of statistical, input-output or econometric methods and social cost-benefit methods which do not rely so heavily on statistical or quantitative criteria. The methodologies that have been used by studies assessing the impact of the restructuring of the Canadian telecommunications industry fall into the quantitative class and make use of:

- a) econometric methods, and
- b) cost-benefit analysis.

Econometric models make use of large numbers of statistical equations which simulate the working of the economy or a particular subsector of the economy, and can be used in analyzing events at the macroeconomy level or the corporate level. Cost-benefit analysis uses both market and non-market data to calculate explicit as well as implicit benefits and costs of particular events of a project, corporate, or public policy nature.

Quantitative methods can be applied to a wide variety of problems but with regard to assessing the impacts of restructuring the telecommunications industry, there are three basic models: economy-wide or macroeconomic models, industry models and corporate models.

Macroeconomic models are usually econometric in nature. They are concerned with the impacts of various policies or events on such economic variables as the inflation rate, the rate of growth of the economy, employment, imports and exports, investment, aggregate demand and the models are specifically designed to measure and predict the impacts of such events as rate restructuring or rate rebalancing in the telecommunications industry on these aggregate economic variables. Both the CNCP and the Bell Canada econometric studies of the impacts of their proposals were of the macroeconomic variety. A second set of models used for measuring macroeconomy impacts is through the use of input-output models which simulate the complete flow of financial and goods and services flow throughout the entire economy. Input-output models depend on massive amounts of data about the interdependent nature of the whole economy. Unfortunately, the input-output tables are costly to update and can be out of date by up to ten years.

Another methodology for assessing impacts is by the use of an industry model which focuses strictly on only those variables relating to the telecommunications industry. An industry model focuses on such variables and parameters as prices of goods and services, market share, investment, strategies, costs, investments, customer or demand parameters and so on. Industry models can use econometric, cost-benefit or financial techniques. The Peat Marwick model, described below falls into the class of industry models which use cost-benefit analysis techniques among others.

Finally, corporate models look at the impact of industry restructuring from the point of view of a single corporation or company analyzing such parameters as market share, demand, cost of production, investment and depreciation and how changes in these parameters affect corporate performance as measured by return on investment, growth, efficiency, profitability, and so on. Since the long distance or toll telephone service market is essentially monopolistic, industry models

and corporate models tend to be identical in the telecommunications industry, particularly, public telephone services, i.e., a model of the public telephone market in Ontario would be a model of Bell Canada.

9. Outline of the Potential Direct Economic Impacts of Restructuring the Canadian Telecommunications Industry

The potential impacts of both the CNCP and the Bell Canada proposals could be considerable although there is no experience, even in the U.S., that could serve as a realistic guide to an assessment of the impacts. The reasons for this is that rates for both local and toll services have only changed by small amounts. Major drops in toll rates or increases in local rates of 15-30% have never occurred. Consequently, there is no historical precedent for major rate changes. It is useful to review some of the arguments of these impacts.

Competition (or rate rebalancing) could force toll rates down so that everyone making long distance calls would benefit by paying lower prices. Both businesses and residential users would benefit in this respect (as the CRTC acknowledges in Telecom Decision 85-19). Lower toll rates could stimulate the demand for toll services, thereby increasing the revenues derived from this segment of the service industry.

On the other hand, if toll services subsidize local services (as many suggest they do) and if the margins derived from toll services are eroded by competition, it may be necessary to raise local telephone rates. Higher local rates could affect every residential and business user.

There are several potential net impacts of these changes. If toll rates drop precipitously without a major stimulation of demand for toll services, local rates could rise by a factor perhaps of two or more and this could result in a major drop-off in subscribers particularly

residential users. The fear is that this would violate and destroy the long held social policy objective of universal public telephone service, i.e., inexpensive, affordable telephone service for almost every household.

There are several crucial assumptions or factors which affect the extent of impacts of both the CNCP and Bell Canada proposals.

One of the most important factors has to do with the impacts of changes in the rates of local and toll services on their revenues, a concept which economists refer to as price elasticity of demand. Generally speaking, the demand for toll telephone service is thought to be elastic while that of local telephone service is inelastic. This means that with a decline in the rates for toll telephone service of say 10%, revenues from this service would be stimulated in excess of 10%, i.e., it results in an expansion of the market. It could happen, for example, that if the demand for toll service were highly elastic, a 10% decline in rates could stimulate revenues by as much as 25%.

The demand for local telephone service, on the other hand, is considered to be highly inelastic. This means that if local rates are raised by, say 10%, the accrued revenue would increase by an amount less than 10%. The extreme case of inelastic demand is when there is no effect on demand when rates are raised. Inelastic demand generally means that the good or service, in this case local telephone service, is a necessity and that changes in rates will not affect demand. An elastic or even a relatively inelastic demand for local telephone service generally means that rate increases would be accompanied by a drop-off in customers. Completely inelastic demand on the other hand, would mean no drop-off of customers with increased local rates.

Evidently, the extent of impacts, from a financial-economic perspective, of rate changes for local and toll services depends upon the elasticity of demand for these two services. The following possibilities apply:

Case 1: Highly inelastic local service and slightly elastic toll service demand: A sharp drop in toll service rates would not result in any major stimulative effect so revenue would have to be made up through sharp increase in local service rates but this would not represent any major drop-off in residential service because demand is highly inelastic.

Case 2: Slightly inelastic local service and slightly elastic toll service demand: The sharp drop in toll telephone rates would have to be offset by even higher increases in local rates because some customers drop-off because of high rates, thereby affecting universal service. Local rates may be forced up even higher as a result.

Case 3: Highly elastic toll telephone service and inelastic local service demand: A sharp drop in toll telephone rates would result in a major growth in toll telephone revenues and an expansion in the market for toll telephone services. This high expansion of the revenues, would not necessitate nearly as great an increase in local telephone rates as in either cases one or two above. This is the most optimistic case of the three because it would have the minimum effect on local services or universal service.

It is apparent from this argument that the financial and economic impacts of major changes in the rates of toll and local telephone services depend to a significant degree upon the elasticity of demand with respect to the price of local and toll telephone services. However, there is no agreement on even the approximate estimates of

those elasticities of demand for large changes in rates such as those often talked about by the industry. For example, in the various studies assessed below, Peat Marwick assumed an elasticity factor of -.9 for toll service demand, Bell Canada used a figure of -.4 while CNCP used the figure -1.1 for business and -1.5 for residential subscribers. Studies of demand and elasticity for telecommunications services are therefore very important for public policy analysis and should be closely monitored.

10. Further (Qualitative) Assessment of Impacts of Competition

Quantitative analysis techniques serve useful but often limited value in the analysis of certain public policies. They often, by necessity, must be complemented by descriptive and qualitative assessments of impacts in order to get a more complete picture. This is true in particular about the impacts of restructuring the telecommunications industry through the introduction of competition.

The classical assessment of impacts of competition can best be described by simply quoting from the CRTC decision, T.D. CRTC 85-19. The Commission concluded that on page 44 of the decision that competition would result in the following:

- "competition would likely result in increased innovation and flexibility with respect to the pricing and marketing of interexchange services;"
- competition "would likely result in the introduction of new services and new service features more closely tailored to meet individual customer requirements and providing a range of quality of service options at differing prices";
- competition would increase the rate of diffusion of new technology, particularly "the more rapid introduction of improved switching and transmission facilities";

- competition "would likely create pressure..., to increase productivity and reduce costs and ... have a positive impact on the performance of the Canadian economy as a whole".

Clearly an assessment of these impacts is as important as the quantitative assessments that have been completed to date and described in this report. For the enormous benefits inherent in these (albeit implied) impacts of competition may clearly offset any rate increases that also result. It also appears clear that few people dispute the positive and beneficial impacts of technological innovation and diffusion besides it being inevitable in any case. What is disputed is whether this should best be accomplished by introducing more competition, what time scale should such adjustments require, what negative distributional impacts will result either from competition or its absence and finally, if there are serious distributional questions, can these be ameliorated through appropriate public policies. As for the benefits or impacts of competition and the benefits of technological innovation and diffusion, perhaps these can best be assessed by a careful study of the United States situation. Once completed, the task remains to assess its significance to Canada.

Finally, it is clear that the telecommunications industry in Canada is going through its most dynamic period in its history and there is little or nothing authorities can do to prevent drastic changes from taking place. Indeed, if rapid change is not facilitated quickly, is it likely that Canadian industry, not only the telecommunications carrier industry, but every industry and every business in Canada will suffer, and with it, every consumer. The result could be a more serious deterioration in our overall economic performance.

11. Review of the Peat Marwick Study: Impacts of
Competition in Message Toll Telephone Services

In September of 1984, Peat Marwick and Partners completed a study for the Department of Communications and several provincial governments. The objectives of the study were "to determine the impacts of competition in the provision of message toll and message toll substitute services in Canada, including its effects on: the various categories of telecommunications users, the telecommunications industry, the pricing of telecommunications services; and the universal availability of basic telephone services; and to describe those effects in their national and provincial dimensions".²

Since the study was initiated for public policy purposes, the focus of impacts was on:

- a) the increase in local rates stemming from a particular scenario; and
- b) the change in penetration or the number of subscribers dropping off the system as a result of higher local rates.

The study developed a base case up to the year 1990 assuming appropriate inflation, growth of demand, capital investment and other factors. Then various scenarios were developed to represent hypothetical cases. For example, the case of no competition but rate rebalancing was examined. Then the case of competition was examined in considerable detail with various scenarios assuming a combination of rate reductions for toll services (i.e., 0%, 10%, 20%, 40%), a combination of loss of market share by the established common carriers (i.e., 0%, 10%, 20%) and finally, a combination of interconnect charges for accessing the toll network (i.e., 0¢, 5¢, 10¢/minute). Related scenarios were developed for cases in which competition was practiced in Ontario, Quebec and Ontario and in Canada as a whole.

Several of these scenarios are worth examining in greater detail, assuming full competition throughout Canada, starting with the impacts on local rates, then proceeding to the case of an assessment of economic costs and benefits, and finally the extent of drop-off.

Scenario 1: No Competition & Toll rate reductions of 10, 20, 40%.

According to the methodology, this scenario which is synonymous with rate rebalancing would commence with rate reductions in toll services of 10% and proceed to 20% and then 40%. This would result in local rate increases of 12.1%, 27.5% and 70.4% respectively.

Scenario 2: Competition, 10% decline in toll rates, a loss of market share of 10% by the carriers together with a 10¢/minute access charge at each end. Local rates would rise 15.5%.

Scenario 3: Competition, 10% decline in toll rates, a loss of market share of 20% by the carriers together with an access charge of 10¢/minute as in scenario 2. Local rates would rise 20.7%.

Clearly, toll rate reductions of these magnitudes over the five year time horizon are not significant, except for the case of 40% reduction in toll rates, i.e., an increase in local rates of 70% over five years is very significant.

Secondly, the study went on to assess the impact on consumers and business of the various scenarios assuming in the case of competition that competition would develop only in intraprovincial markets where there was profit to be made. In this case, the impact was measured by the gain or loss in consumer surplus, i.e., total net economic benefit or cost.

Scenario 1: No Competition: Toll rate reductions of 10%, 20%. The consumer surplus generated by the 10% rate reduction was

estimated to be \$85.78 million (1983 dollars) for business and \$134.7 million for residential users. With a rate reduction of 30%, the business consumer surplus was calculated to be \$152.52 million while that of residential users was \$262.6 million.

Scenario 2: Competition: Toll rate reductions of 10%, 20%. The estimates of business consumer surplus and residential consumer surplus were \$65.3 million and \$93.07 million respectively for the 10% case and \$55.4 million and \$115. million for the 20% case.

In conclusion, the consumer surplus generated by rate rebalancing was calculated to be greater than that resulting from competition in both the 10% and 20% cases. Secondly, residential users benefited more than business users in both cases. These estimates indicate that rate rebalancing is more favorable to consumers relative to the competitive scenario, but the results were very sensitive to the assumptions made in these scenarios, i.e., for other scenarios, this was not the case.

The study also attempted to estimate the rate of drop-off of residential subscribers, i.e., decreased penetration of telephone services, under the various scenarios, using a demand model of the industry. Two scenarios are described here.

Scenario 1: No Competition, 40% reduction in toll rates. The study estimated that the increase in consumer surplus would be \$.6 billion but that about 33,000 subscribers or about .4% would abandon service.

Scenario 2: Competition, 10% rate reduction, 20% traffic loss. The estimate of net consumer surplus was \$170.74 million while the estimate of drop-off was 5-6000 or .07% of total residential subscribers.

12. Conclusions on Microeconomic Models and Impacts

Several conclusions can be drawn from this review. Under the various scenarios and hypothesis, moderate changes in the rates of local and toll telephone services (i.e., lower toll rates of about 10-20%) resulting either from competition or rate rebalancing should not have a very great impact on either the business or residential community over the five year period nor would this necessitate major increases in local rates or changes in penetration rates. Therefore, such changes are likely to have little impacts on universality of service over five years to 1989.

For larger rate changes, i.e., of the order of 30-40% decline in toll rates, the impacts could be significant. However, for relatively large changes in toll or local rates, the model used probably does not accurately measure the impacts because of the crude estimates of the price elasticity of demand for toll and local services for business and residential customers. The study used an estimate of price elasticity of demand for toll telephone service of -0.9 whereas it is more likely to be elastic, i.e., perhaps as high as -1.5, in which case the impacts on rates could be significantly different.

The model also used relatively crude techniques for estimating where competition would occur, i.e., it was not specific about the routes along which competition would occur. It also did not attempt to estimate the effects of cross-elasticity or substitution effects from non-toll services such as private line services, nor did it adequately deal with productivity effects, economics of scale, efficiency effects due to the introduction of new technology, etc. All of these are serious weaknesses of the exercise.

13. Overview of the Use of Macroeconomic Models to Study Impacts

Both Bell Canada and CNCP commissioned macroeconomic studies to assess the impacts of the two proposals presented to the CRTC. Before examining the results of these two studies in detail, several comments are in order concerning the structure of econometric models.

Macroeconomic methods generally operate in the following way. Rate reductions in toll services and rate increases in local services together with estimates of such parameters as increased or decreased traffic demand, revenues and expenditures are fed into the econometric models. These models do not generally have a very sophisticated telecommunications sector block so all of the basic parameters must be fed into the models. In this sense, typical econometric models may be weak in assessing telecommunications impacts because the only mechanism for measuring impact is through price or rate changes, i.e., there is no allowance for productivity or efficiency effects or quality of service effects, etc. In the models, rate reductions result in an increase in the level of real disposable income, i.e., the money that consumers and business have to spend increases and this, in turn, increases the demand for all goods and services as well as generating increased savings for investment. Increased demand will be experienced not only for telecommunications services but all other goods and services in the economy as well.

Through the multiplier effect, increased aggregate demand stimulates income, consumption, investment and employment. Government tax revenues and transfer payments, and imports and exports are affected as well. In this way, the macroeconomic models are able to estimate the effects of rate changes in the telecommunications industry on inflation, price level, income, employment, investment, balance of payments and the public deficit.

14. Review of the Bell Canada-Informetrica Study

The Bell Canada-Informetrica Model was designed to assess the macroeconomic impacts of rate rebalancing over the five year period up to 1989. The model assumptions were as follows:

Assumptions:

1. Local residential rates would rise 175%
2. Local business rate would rise 34%
3. All toll rates would drop 60%
4. The elasticity of demand for toll services = $-.4$
5. The elasticity of demand for local services = $-.07$

The results of the simulation were as follows:

- a) The average price (local and toll rates) for residential users would raise 10.3% while the average price for business users would fall 22%. The average price of business and residential users together would fall 11%.
- b) The consumer price index (CPI) would drop .2% as a result of the lower prices paid for telecommunications services.
- c) The Gross National Product (GNP) would increase by \$2 billion, with the cumulative impact over 5 years being \$4.6 billion (1983 dollars).
- d) The unemployment rate would drop .07% or 12,000 more people would be employed.
- e) The government deficit would decline by \$885 million in current dollars, through lower interest charges, a larger tax base, etc.

15. Review of the CNCP - Data Resources Study

The CNCP-DRI model assumed different assumptions from the Bell-Informetrica model and hence the two results are not directly comparable. The CNCP-DRI econometric model was not designed to assess the impact of rate restructuring but rather competition in toll services. The model assumptions were as follows:

1. Long distance or toll telephone rates would decline by 15% over five years. A second scenario assumed a 30% reduction in toll rates.
2. The elasticity of demand for toll services was -1.1 for business users and -1.5 for residential users. This was in sharp contrast to the assumptions by Bell Canada, that the demand for toll services is elastic.
3. The demand for local service was assumed to be inelastic.

The results of the simulations were as follows:

Impact on Macroeconomic Variable over five years	Reduction in toll rates	
	15%	30%
Real Disposable Income	\$235m (.2%)	\$554m (.5%)
Real GNP	\$271m (.2%)	\$607m (.4%)
Total Employment	6,000 (.1%)	15,000 (.1%)
Federal Deficit	-\$503m (-2.1%)	-1,197m (-5.1%)

16. Conclusions on Macroeconomic Models and Impacts

In summary, it is difficult to assess the relevance of those two macroeconometric exercises to estimating the impact of competition and rate restructuring on the economy. The models make significantly different assumptions, particularly with regard to the estimation of the elasticities of demand. These models do not make any attempt whatsoever to develop a telecommunications module for their assessment simply because little is known about how this could be done. In short, these models only capture the direct effects dealing with infrastructure are not treated. Finally, those econometric models fail to capture the dynamic changes taking place in the industry, the introduction of more efficient digital technology, the integration of computer and telecommunications technologies and the increasing reliance of other industries on the digital telecommunications infrastructure.

PART IV: SUMMARY

17. Summary and Conclusions of Report

This report makes an examination of the regulatory and economic impacts of restructuring the Canadian telecommunications industry.

The report consists of four parts. The first part introduces the subject matter with an examination of the underlying forces which are exerting enormous pressures to restructure and change the complete structure of the Canadian telecommunications industry. In general, the reports concludes that with or without explicit decisions by the Commission or the federal government, the forces tending to restructure the industry are just too great for the existing regulatory and industry structure to cope with. Furthermore, many of the changes are necessary and beneficial for the industry and the economy as a whole. Finally, the issue is not one of whether to restructure the industry or not but how to most effectively cope with the enormous changes ahead, over what time scale and to find ways to most effectively cope with effects of change on those most adversely affected.

The second part of the report examines the meaning and significance of restructuring the telecommunications industry, describes various proposals that were presented to the CRTC in 1984 and 1985 and assesses the significance of these proposals to regulatory policy. Finally, a brief analysis of Telecom Decision CRTC 85-19 which represents the first comprehensive effort and examination from a regulatory policy perspective of the whole issue of restructuring the Canadian telecommunications industry.

The report concludes that while the CRTC did appear to accept the principles of introducing competition in the supply of long distance public telephone service and for rebalancing the rates between local and long distance services, it did reject both the CNCP application to

permit it to enter the long distance market and the Bell Canada proposal to rebalance local and long distance rates. The CRTC did extend the scope of competition in the industry, however, by permitting the resale and sharing of facilities and services, and by permitting the interconnection of private local network facilities and public non-voice network facilities to the facilities of the carriers.

The final section of part two of this report discusses the needs and requirements from a regulatory policy perspective to effectively deal with the major issues confronting the federal government and the CRTC in restructuring the telecommunications industry. Among these are mechanisms to ensure the continuation of universal public telephone service, an acceptable cost separations methodology, the establishment of effective and workable boundaries between competitive and monopoly segments of the industry and for carriers supplying both competitive and monopoly services, the implementation of cost-based rate making, the introduction of incentives to better serve the Canadian public and adapt to changing technological, and demand conditions and for the carriers to become more efficient in their operations.

The third part of this report is an economic assessment of the impacts of restructuring the Canadian telecommunications industry by:

- a) rate rebalancing i.e., the Bell Canada proposal, and
- b) introducing competition in the provision of toll telephone service as was the substance of the CNCP application to the CRTC.

Various methodologies were used to assess the economic impacts of restructuring the industry. The Peat Marwick study attempted to assess the impacts on local rates, universal service and net economic benefits and costs using a model of the industry. An analysis of various scenarios representing probable impacts indicated that rate reductions in toll service of up to 20% would have little impact on the rates for local service or for universality. For rate reductions in excess of

25% it was concluded that although it would result in adversely high local rates, this methodology was unlikely to be very reliable because of the assumptions and estimations of such factors as the price elasticity of demand.

Bell Canada and CNCP commissioned studies to assess the impacts using macroeconometric models. These models were difficult to compare because they assumed different values of elasticities of demand, and assumed different impacts on such factors as price changes and so on. It is difficult to estimate how accurate the results of these studies are. However, one has to question whether or not impacts such as a .07% change in the unemployment rate is significant, or if a .2% change in real disposable income is significant. In summary, the results of macroeconometric models mean little or nothing because the results may be within the margin of errors of the models.

Certain critical weaknesses are characteristic of both approaches to assessing impacts. These include:

- a) The models depend heavily on time series data going back 10-20 years. As such, the models tend to reflect the telecommunications industry of a decade ago, rather than the highly dynamic industry in recent years. Historical data is a strength as well as a weakness to these approaches.
- b) The models suffer from a critical lack of pertinent data which is just not available, for example, the estimates of elasticities of demand for toll and local services by business and residential customers are not reliable, even after many years of research. Bell Canada and CNCP assumed completely different values of the price elasticity of demand, i.e., Bell Canada assumed that the demand for toll was inelastic, while CNCP assumed it was elastic.

- c) Both approaches fail to capture the many technological changes taking place not only in the telecommunication service supply industry but on the demand for services as well. In particular, the business environment in recent years has become more dependent on computers, on computer/communications and on more varied kinds of high quality efficient integrated telecommunications services. These approaches fail to describe or consider these changes.

- d) As far as the economy-wide impacts of restructuring the telecommunications industry are concerned, it is clear that little if anything is known about the role of telecommunications in industrial or economic development. It is an increasingly widely held view that telecommunications, computers and microelectronic technologies are restructuring industry, business and the economy. Yet none can describe this, and this must be described before its quantitative implications can be made.

Finally, several proposals are offered as a means of assessing the impacts of restructuring the Canadian telecommunications industry. These include the following:

- a) A series of studies should be conducted to determine what is taking place or are about to take place in the industry. Interviews with businessmen in various industry sectors as well as the telecommunications industry should be part of this approach.

- b) Several case studies should be conducted of a particular leading edge company, an industry or an industry sector as a means of identifying and establishing trends. This would serve to provide a picture of the economic, industrial and technological trends.

- c) A third approach is one designed to assess the telecommunications industry as a more crucial infrastructure for economic and social development and for industrial development. This could focus on local, regional, national or international infrastructure and relate to the changing nature of economic activity, trade in information services, access to information and communications resources, efficiency effects, competitive effects, etc.

- d) The U.S. telecommunications industry is well into the era of deregulation, yet we know little about the effects of competition. Further study of the U.S. experience may shed some light on these questions, and, in turn, assist Canadian public policy efforts.

These four approaches would appear to be as important, if not more so, than the macroeconometric and industry models described in this report. Numerical estimates of particular impacts are nice but if they are inaccurate, or irrelevant, it does not serve to rely on them. On the other hand, it is often better to understand the situation and describe it qualitatively even if it cannot be described quantitatively than to have no understanding of it but be able to apply some statistics to it.

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