THE ECONOMICS OF THE CANADIAN CABLE TELEVISION INDUSTRY

Thesis for the Degree of Ph. D.
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ROBERT ELWOOD BABE
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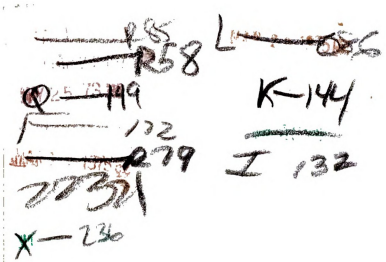
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ABSTRACT

THE ECONOMICS OF THE CANADIAN CABLE TELEVISION INDUSTRY

By

Robert Elwood Babe

Cable television in Canada, while in existence since the early 1950's, has in the past three or four years become a hotly debated subject by the public, government regulators, and by the broadcasting and telephone industries. However much of the debate has been, by and large, devoid of factual and analytical content. This dissertation attempts to somewhat rectify the situation by providing the first comprehensive economic analysis of cable television in Canada.

Three broad areas of study in connection with CATV are explored in the thesis. Chapter II analyses the costs of establishing cable systems of various sizes in an effort to determine whether or not cable television is a "natural monopoly" in the classic sense of the term and whether cable may be expected to serve rural areas in the near future. Conclusions reached on these questions will have important ramifications for public policy with regard to issues studied in the subsequent two chapters.

Chapter III details the relationship existing between the cable companies and the telecommunications common carriers and assesses the desirability of instituting government policy toward fostering competition between the two industries for certain communications services.

Chapter IV deals with the economic impact cable television may be expected to have upon traditional broadcasting in Canada and offers some policy conclusions.

Many of the data are original and have been gathered by contacting individual cable companies and broadcasters. These data derived from many such sources have been combined and analysed to provide a cross-sectional study of the CATV industry. Other data used were of a semi-private nature, being derived from confidential studies that have only a limited circulation. Other data originated with the CRTC, the CBC, and Statistics Canada, some being publicly available and other confidential. An econometric model using confidential data possessed by the CRTC forms a large portion of the fourth chapter. Other data sources are cited in the text.

The principal conclusions of Chapter II are: (a) Cable television is a natural monopoly in the sense that direct competition among firms cannot long survive, but it does not possess the common natural monopoly characteristic of large economies of scale. In fact, significant diseconomies of scale are found in the industry, indicating that small firms may prove to be more economically efficient. (b) The costs

of establishing and operating CATV systems are so high that serving rural areas would appear to be highly unlikely in the near future. (c) As developed in Appendix A, cable t.v. bears many of the characteristics of traditional public utilities.

The principal conclusions of Chapter III are: (a) Telephone company restrictions upon CATV are harmful both to the growth and development of cable television and the effective functioning of the Canadian telecommunications industry. (b) At least a limited form of competition between cable systems and the telephone companies would be economically viable and would be in the public interest.

The principal conclusions of Chapter IV are: (a) Cable television has not yet had a serious adverse effect upon the Canadian broadcasting system, but if left free from regulation could have in the near future. (b) Governmental policy can be directed simultaneously toward fostering the growth of cable television and the protection of traditional broadcasting stations. (c) There need be no conflict in encouraging cable growth in order that CATV may compete effectively with the telecommunications carriers while at the same time fostering a viable broadcasting industry in Canada if governmental regulation were centralised to a greater degree and followed the suggestions contained in the body of the work.

THE ECONOMICS OF THE CANADIAN CABLE TELEVISION INDUSTRY

By

Robert Elwood Babe

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1972

To My Mother

ACKNOWLEDGMENTS

The germinal idea for this study was born in 1969 as a result of attending Walter Adams' graduate course in competition policy. At that time, cable television was a rarely discussed topic in the United States, even though it had been in existence in that country for many years, but in Canada CATV had become a hotly debated issue. Therefore, the time seemed propitious to commence study in an area in which little research existed (since, after all, most areas of research begin in the United States), and which, at the same time, was of vital significance to Canada.

There are many people who must be thanked, since, without their help, large sections of this study would have been impossible to complete. The first must be Professor Adams. Without his initial suggestion the study might never have been begun at all and without whose consolation and guidance might never have been completed.

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CHAPTER I

INTRODUCTION

Like Quebec and economic nationalism, communications policy is one of the most widely discussed domestic issues in Canada today. All three issues have vital importance for the survivability of the nation.

In this regard, the significance of broadcasting was recognised early. In summarising his history of Canadian broadcasting, Frank Peers states:

> The aims [in establishing a national broadcasting system] have been national survival, whether in English or French Canada or in Canada as a whole; a Canadian sense of identity; national unity; increased understanding between regions and language groups; cultural development; and serving the Canadian economic interests....[1]
>
> In 1935 Graham Spry explained that there were two motives that led to the broadcasting legislation of 1932. "The first of these driving motives was the national motive, and it was predominant. The second motive was the free use of broadbasting by all sections of opinion. The positive aspect of the national motive was the use of broadcasting for the development of Canadian national unity, and the negative aspect was the apprehension of American influences upon Canadian nationality, particularly as it concerned public opinion."[2]

---

[1]Frank Peers. The Politics of Canadian Broadcasting 1920-1951 (Toronto: University of Toronto Press), 1969, p. 440.

[2]Ibid., p. 441.

In fact, it has been said that Canada is a country that "exists by reason of communication."[3] But communications in Canada, and in particular broadcast communications, is very difficult and costly. There are several reasons for this. In the first place, the country occupies a land space of some 3.8 million square miles but has a population of just over 20 million people.[4] This makes all forms of communications highly expensive when costs are placed on a per capita basis.

In the second place, Canada's bilingual nature means that the country must support two separate broadcasting systems, which will serve to increase costs well beyond the cost of the service used by either the French or English users considered separately.

In the third instance, proximity to the United States and the fact that the population is in most part located within one hundred miles of the border, with the result that many people can receive signals from a country with a much wealthier broadcasting system, means that the small Canadian audience is in some part drawn away from the native system.[5] The danger that exists to a country's survivability due to this type of

---

[3]Harry J. Boyle, "The Canadian Broadcasting System". A speech at the Canadian Section of the Association for Professional Broadcasting Education Seminar, Washington, D.C., Nov. 6, 1970. (Mimeo.) P. 8.

[4]Dominion Bureau of Statistics. Canada Year Book, 1969 (Ottawa: Queen's Printer), pp. 2 and 157.

[5]Royal Commission on Broadcasting. Report, 1957 (Ottawa: Queen's Printer, 1957), pp. 7, 8.

situation has been described by an American economist.

> The cultural homogenity that has been underway for years in the United States now threatens to overtake the globe.... Everywhere local culture is facing submersion from the mass-produced outpourings of commercial broadcasting....[6]
>
> Communications material from the United States offers a vision of a way of life.... The image is of a mountain of material consumed. The emphasis in the programming and advertising is on the first and last elements in the American tryptych (sic)....[7]
>
> What is involved is the cultural integrity of weak societies whose national, regional, local or tribal heritages are beginning to be menaced with extinction by the expansion of modern electronic communications, television in particular, emanating from a few power centers in the industrialized world.[8]

Public policy in connection with broadcasting, then, has reflected a belief that broadcasting has a special significance to the survivability of the nation, that broadcasting is not "just another industry" to be governed wholly by the impersonal forces of the market place. Rather, it has been seen by government as an instrument to be used in implementing the national policy. As The White Paper on Broadcasting stated

> Any statement of policy related to broadcasting in Canada therefore starkly poses this question. How can the people of Canada retain a degree of collective control over the new techniques of electronic communication that will be sufficient to preserve and strengthen the political, social, and economic fabric of Canada, which remains the most important objective of public policy?...

---

[6]Herbert I. Schiller. Mass Communications and American Empire (New York: Kelly), 1970, p. 112.

[7]Ibid., p. 3. The three elements of the American triptych are said to be "freedom of trade, freedom of speech and freedom of enterprise."

[8]Ibid., p. 109.

> Broadcasting may well be regarded as the central nervous system of Canadian nationhood.[9]

In a similar vein, the Special Senate Committee on Mass Media reported

> "... what is at stake then is not only the vigor of our democracy. It also involves the survival of our nationhood. A nation is a collection of people who share common images of themselves. Our love of the land, and our instinctive yearnings for community implant that image in the first place. But it is the media--together with education and the arts--that can make it grow.... What we are suggesting is that the Canadian media--especially broadcasting--have an interest in and an obligation to promote our apartness from the American reality....[10]

What are the goals set for the Canadian broadcasting system? Chapter IV explores in some detail the statutory obligations placed upon broadcasters. For present purposes, it seems better to quote from a philosopher of broadcasting, Harry Boyle, the Vice-Chairman of the Canadian Radio-Television Commission.

> By what criteria do we judge the quality of a country's broadcasting? To be good--or even adequate--there must first be a multiplicity of individual organizations serving the whole. There must also be the widest range and variety of programmes offered to listeners and to viewers, and safeguards must be taken against the narrowing imitative process by which so much broadcasting is merely a frantic effort to secure numerically for one set of broadcasters a certain total of audience, ignoring, in effect, all others who remain untouched by the narrow spectrum of the programme fare.

---

[9]Judy Lamarsh. White Paper on Broadcasting, 1966, p. 4.

[10]Special Senate Committee on Mass Media, Mass Media, Vol. I (Ottawa: Information Canada), p. 11. (Italics in original.)

> There must be the widest degree of freedom to tell and to show the truth.
>
> Fundamental to it all, there must be an attempt to reveal society to itself....[11]

If the three goals for a nation's broadcasting as set out above can be accepted--i.e., diversity in programme sources, creative freedom, and relevance to the social situation, one may assess the impact of cable television upon the broadcasting system's ability to fulfil these objectives. We shall return to these three points in the concluding chapter.

The fact that Canadian nationalism is inseparable from public policy in broadcasting makes a study of the broadcasting industry very much more complicated than it otherwise would be. Whereas the usual prescription given in economic studies of most industries is that public policy should be directed toward the implementation of the maximum degree of competition possible in order that the consumer may be protected, in the broadcasting industry it will be found that uncontrolled competition directs broadcasters' behaviour in a direction diametrically opposed to the national policy. If this national policy is to be implemented partially through private broadcasting the question then becomes: How can government, after partially removing the control factor of competition, direct broadcasters' behaviour in such a way as to implement its

---

[11]Harry J. Boyle. Responsibility in Broadcasting. A speech delivered to the Meeting on Mass Media, Trade Regulation Roundtable, Association of American Law Schools, San Francisco, Dec. 29, 1969. (Mimeo.), p. 33.

national goals while at the same time preserving some vestige of private broadcasting? The answers to this question are not at all clear.

The present study is an industry study of the cable television industry. It is of necessity then also a study of the broadcasting industry since CATV obviously is closely associated with traditional broadcasting. As such, the present work has a bearing upon the question of Canadian nationalism. This is also a study of the telecommunication industry since CATV is intimately connected with this element of Canadian business also. It may be noted in passing that telecommunications in Canada has also been an instrument of national policy.

What this study attempts to set out is, briefly, the place of CATV in the broadcasting and telecommunications industries--its relations and interrelations with the broadcasters and communication common carriers. Based on the data presented and relationships discovered, the study presents what would be the results of certain public policy alternatives and analyses the benefits and costs of these different measures.

Cable television, also referred to as wired television, community antenna television, and CATV, in its most basic form, is an alternative television programme distribution system whereby broadcast television signals are trapped "off-the-air" by a sophisticated array of antennae and delivered to subscriber homes by means of a coaxial cable distribution

system. In effect, then, in its original form, CATV is simply an arrangement whereby the residents of a community pool resources in order to construct a superior television antenna, which, because of its expense, would be beyond the means of all but a few individual households alone. Rather than the sharing in the actual construction costs as such, the establishment of a cable television system is generally left to private enterprise, and community residents subscribe to the services of the system. However, the concept of a shared facility remains valid.

This sharing of community resources has provided both a greater number of television channels to subscribers (since the expensive antenna array is able to receive more broadcast channels than would be receivable with only an ordinary outdoor antenna) and better reception of the channels that can be received in the community by ordinary means.

Cable television to-day, of course, means more than this, as it also creates a local television station in areas in which no local station had previously existed and an extra television channel in areas that already possessed a local outlet. This is due to the fact that CATV systems can programme directly into the homes of subscribers by feeding programme material directly into the cable distribution system without "broadcasting" the signals by means of a transmitter.

Cable television also conjurs up visions for communications tomorrow. Due to the great informational capacity of

coaxial cable, cable television can transmit any and all information that can be encoded into electronic signals simultaneous with its transmission of thirty or more television signals. The capacity of a coaxial cable is several hundred times that of the telephone plant, and so as a new telecommunications carrier, CATV offers the promise of more rapid and widespread information distribution so as to have, perhaps, as great an impact on the economy and on society as the inventions of the telephone and automobile have had.

This study may be termed comprehensive since it attempts to deal with most of the important areas that act upon CATV and that are acted upon by CATV, since "tunnel-vision" is an area requiring important public policy decisions may prove to be harmful.

Chapter II presents and analyses original data on the costs of cable systems since it was felt that no policy decisions should be made without a thorough understanding of the cost structure of an industry. Chapter III investigates the relationship that exists between community antenna television systems and the telecommunications common carriers and examines the potential possessed by CATV for altering the telecommunications environment. Chapter IV analyses the impact cable television has had and will have upon the broadcasting industry in Canada. In the process of this analysis, I have found it necessary to provide the first systematic analysis of the economics of commercial television broadcasting

in Canada, since the impact of cable could not be adequately understood without a detailed knowledge of the television industry itself.

While each of these three chapters is quite self-contained, hopefully a synergism has been created by the existence of all three. For example, it may be felt that public policy should be directed toward the encouragement of the expansion of cable television so that it may develop into a wide-band communications network in competition with the telephone companies, while at the same time it may be felt that public policy should be directed toward discouragement of the growth of cable television since it may be felt that such growth threatens the very survival of the Canadian broadcasting system and might erode any further possibility for the development of a uniquely Canadian culture. Reasonable policy conclusions derived by studying either problem in isolation could have undesirable effects on the chances of attaining the other goal. Hopefully, the chances of such an occurrence are less when a "comprehensive" study is undertaken.

This is not to say that the study exhausts the subject of CATV. Among the important topics that are not treated or treated only tangentially are the following: (i) the proper role of the community and the province in regulating CATV; (ii) criteria to be used for granting licence applications; (iii) an investigation into the economics of local cablecasting and the proper role to be played by such programming

in the whole broadcasting structure; (iv) the obligations under which CATV owners should operate--for example, the educational use of cable, Canadian content, service standards, number of channels offered, etc.; (v) the allowance or prohibition of advertising on cablecasting channels; (vi) the copyright implications of CATV's re-transmission of broadcast programme material; (vii) the implications and feasibility of the formation of cable networks, (viii) cross-media ownership of cable systems with other media and concentration of control in cable television itself; (ix) estimation of the demand curve for cable television.[12] However it does remain true, I believe, that the following treats the most important issues s rrounding CATV to-day.

---

[12]Many of these questions are raised by Pierre Juneau, Chairman of the CRTC in Standing Committee on Broadcasting, Films, and Assistance to the Arts. Minutes of Proceedings and Evidence No. 12. Nov. 18, 1968. (Ottawa: Queen's Printer), 1968.

CHAPTER II

THE ECONOMICS OF CABLE TELEVISION

This chapter discusses the economic costs of establishing and operating cable television systems. Particular attention is paid to possible economies of scale, since the CRTC has divided up the larger municipalities when granting licences, so that some cities have several cable firms within their boundaries, each with an exclusive territory. For instance, Metropolitan Toronto has some dozen cable firms, several with two or three blocks of territory completely isolated from their other territory. This policy of fragmenting areas may make sense if the economies of system size are not large; however, on purely economic grounds this policy would be inefficient were economies of large scale found to be significant.

Also, by studying the cost structure of cable television firms, one can study the reasonableness of granting exclusive licences. Exclusive licences are normally given in cases where an industry is felt to be a natural monopoly and competition would cause the weakest firm to fail and/or in cases where duplication of equipment (generally transmission lines) is felt to be economically wasteful. By investigating the

capital invested per subscriber for cable systems, the extent of this "waste" may be determined, if, indeed, it exists at all.

Also, by studying the cost structure of CATV, some tentative conclusions can be reached regarding the feasibility of extending cable service to rural areas. Since CATV at present exists only in urban areas, the data used in the study, which are derived from urban centres, are used to infer the costs of serving rural areas. The question of the viability of CATV in such underpopulated centres is important for at least two reasons.

In the first place, broadcasters often cite the deprivation of service to rural audiences that could result were CATV allowed to grow free from regulatory constraints, since the absence of regulatory control could result in a weakening of the financial solvency of broadcasters, possibly causing some to go out of business. Without the extension of CATV to rural areas, a significant segment of the population might be deprived of television altogether.

In the second place, some see cable television evolving into a tele-data-processing system. Bell Canada and other telephone companies see this development as a threat to both their present and future services. They claim that unregulated CATV would tend to serve only the plush, urban markets while leaving the less profitable rural areas to the common carriers. It is claimed the telecommunication companies need

the rich urban centres in order to subsidise their operations in the less profitable rural areas. This "cream-skimming" argument may be partially assessed by examining the economic structure of current community antenna systems.

This chapter begins by describing as briefly as possible the technology of cable television. This is necessary not only for a general knowledge of cable t.v., but also in order to make the cost studies more meaningful. As well, there are certain technological limitations to cable systems and these limitations must be explained before optimal system size can be discussed.

Next the economies involved in constructing a cable television system are explored. In order to do this, the question is approached from different angles. Figures obtained from CATV engineers and construction companies are reproduced and analysed and the average amount of fixed capital invested per mile of cable plant, per subscriber, and per potential subscriber, for a sample of existing systems of various sizes is estimated. A detailed analysis of the operating costs of a cable television systems is presented, and one can explore possible economies in operating large systems after they are established. The next step is to integrate the two sources of economies (original investment and operating costs) and attempt to determine a minimum optimal scale of plant. We are then in a position to evaluate the feasibility of serving rural areas.

Finally a comparison of CATV with traditional public utilities is developed in Appendix A, and some CATV revenue data is presented in Appendix B.

I. Technology

In this section the basic technology of cable television is explored; however, what must be done in order to create a switched, multi-band data carrier out of CATV is not described since this is more conveniently dealt with in the next chapter which deals with CATV's potential as a tele-data-processing system and its relations with computer utilities and the barriers to technological change imposed by the existing common carriers and the government.

A typical cable television system may be divided into three component parts: (i) the head-end, (ii) the trunk line, and (iii) the distribution system.

The head-end consists of antennae, preamplifiers, filters, gain control devices and other electronic equipment. The head-end traps the broadcast signal from off-air, amplifies it and cleans it up. In some cases the frequency (i.e. channel) is changed for distribution. The trunk-line connects the head-end to areas to which the signals are to be distributed. The trunk line carries all the channels that are to be received, and these channels are "mixed into one wide band, frequency division, multiplexed system."[1]

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[1]James R. Palmer. "CATV-Design Philosophy and Performance Criteria as the Basis for Specifying Equipment Components" IEEE Transactions on Broadcasting, Vol. BC-13, No. 2, April 1967, p. 57.

The distribution system transmits the signals from the trunk line to the television set.

Since television signals attenuate when passing down the trunk cable, amplifiers are placed periodically throughout the length of the trunk (typically every 1500 to 2200 feet) and are said to be in "cascade." Cascading amplifiers in this way presents problems, however, as shall be seen later.

The trunk line also consists of passive (or non-amplifying) devices, such as splitters, taps, couplers, etc., these devices serving to join the distribution system to the trunk line for example. They tend to weaken the signal.

The transmission line is coaxial cable, which is made up of a central copper wire with an outer layer of insulating material, which is in turn surrounded by a metal tube of copper or aluminum which acts as a shield to prevent radiation from the cable. Several such copper conductors may be squeezed together into a single coaxial cable (coaxial cable being a generic name), however this is not generally the case for cable television distribution at the present time.[2]

It is through the technology of coaxial cable that CATV's great potential lies. Cable of the type used in cable television systems has available a frequency range of 0 to 300

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[2]See Ralph Lee Smith. "The Wired Nation", in The Nation, May 18, 1970, p. 584 and "Coaxial System Will Handle 34,200 Channels" in Bell Laboratories Record, October 1965, pp. 384-5.

MHz.[3] Normal VHF television occupies frequencies between 54-88 MHz and between 174-216 MHz.[4] By allowing a bandwidth of 6 MHz per television channel carried, it would be theoretically possible to carry fifty video channels on present coaxial cable. Due to technical problems that are difficult and expensive to resolve (such as interference between channels, which need not be adjacent channels) a more realistic figure may be 25 to 30 channels.[5] This figure could be easily doubled, of course, by simply adding another copper conductor, as well as using more sophisticated methods. By contrast, the useable spectrum of typical copper pair wire as used in telephone lines is about 1 MHz. For each 6 MHz of spectrum (i.e. each television channel) generally 600 telephone signals may be accommodated.[6]

When accompanied by switching equipment, the carrying capacity and useages of coaxial cable for telecommunications is practically limitless for purposes in which the transmitting and receiving stations are fixed geographically (i.e. for non-mobile communications).

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[3] TV Communications, October 1968, p. 82.

[4] TV Communications, June 1968, p. 94.

[5] John de Mercado. "Switched Multiservice Cable Systems" (mimeo). Department of Communications. Seminar on "The Wired City," Telecommission Study: The Telecommunications Environment. University of Ottawa. June 25 to 28, 1970, p. 6.

[6] Ibid., p. 20.

Generally, CATV systems in Canada are only equipped to carry 12 video channels as a maximum (some as low as 6) but this is not the fault of the coaxial cable itself, but rather of the supporting devices, such as filters, amplifiers, etc. It has recently been announced, however, that the first 20-channel cable television system was being constructed in Toronto.[7]

There are three methods used in constructing a cable t.v. system. The cable may be strung on telephone or hydro poles (aerial construction), placed in ducts or conduits when room is available, or simply placed in the ground without any supporting conduits. All three methods possess inherent advantages.

Aerial construction is generally felt to involve the lowest capital costs. However, due to the fact that the cable and accompanying electronics are continually exposed to the weather, the maintenance charges will be higher than going underground. A further very real disadvantage of building an aerial plant is that the cable companies are subject to certain restrictive practices of the telephone companies. This point will be dealt with at length in the next chapter. Due to difficulties in obtaining easements or rights-of-way, often this is the only practical method of constructing a cable plant in established urban areas, however.

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[7]Toronto Telegram, Jan. 21, 1971. The system is Rogers Cable and has received the technical certificate from the Department of Communications.

Construction of a system using ducts is the preferable method. It has the aesthetic advantages of the buried plant over the aerial plant, while at the same time it provides the same ready access for maintenance purposes as the aerial plant. Room is not always available in established ducts, however, and this method involves higher costs than aerial construction. Going underground tends to be most feasible when building a cable system in a new subdivision, when negotiations can be made with the single contractor.

Burying the cable is very costly, although much cheaper than duct construction if the CATV operator has to instal his own ducts. It has the disadvantage of inaccessibility for repair purposes; also, the soil and underground rodents may damage the cable.[8]

Next, the technical limitations on CATV systems are described. This is a most difficult task to complete concisely or non-technically and so a fairly extensive bibliography is included in the footnotes to help compensate for any inadequacies.[9]

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[8]See TV Communications, Sept. 1968, pp. 64-66; TV Communications Dec. 1968, pp. 69-72; Canadian Telephone and Cable Television Journal, June-July 1968, p. 4ff.

[9]See William A. Rheinfelder. CATV System Engineering, third ed. (Blue Ridge Summit: Tab Books), 1970. Ken Simons. Technical Handbook for CATV Systems. third edition (Philadelphia: Jerrold Electronics), 1968; James Palmer, op. cit.; John de Mercado, op. cit.; D. N. Carson, "CATV Amplifiers: Figure of Merit and the Coefficient System", IEEE Transactions on Communication Technology, Vol. Com-14 No. 4, August 1966; Orville D. Page CATV Transmission Systems Design for Reliable

The two main limitations on cable t.v. systems are system length and system capacity. System length describes the maximum possible length of trunk cable from the head-end that may be employed while still maintaining a high technical standard (picture quality) at the end of the system. System capacity involves the number and frequencies of channels that may be carried without what is judged to be undue co-channel interference, which again will harm picture quality. While these two factors are at first treated separately, they interact. The total length of a trunk cable from the head-end is limited due to the method used in transmitting the signal. Long-haul (microwave) telecommunications systems often involve both a receiver and transmitter at each station along the distribution path. In effect, the signal is received, processed, and a new identical signal is broadcast. Through this re-creation process the signal integrity can be maintained.

Through a systen of cascaded amplifiers, CATV systems operate on a different (less costly) principle. As the signals from the head-end travel down the trunk cable, they become weakened and amplifiers serve to renew them. However amplifiers find it impossible to distinguish between the desired signal and noise (interference) elements which are

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Year-Round Operation", IEEE Transactions on Broadcasting, Vol. BC-15, No. 4, Dec. 1969; R. D. Chipp, "CATV Technical Standards", IEEE Transactions on Broadcasting BC-12, No. 1, June 1966; TV Communications (various issues); Canadian Telephone and Cable Television Journal (various issues).

unwanted. Both are amplified at each amplifier. Along the cable length, noise elements are added, while the desired signal attenuates. In fact, the amplifiers themselves add noise and may add unwanted distortion of the signal through compression or expansion of the peaks of the wave lengths.[10]

One of the specifications for an adequate picture is the maintenance of a suitably high signal-to-noise ratio.[11] Generally, to obtain highest quality reception, a signal-to-noise ratio of 40 dB should be maintained.[12] It becomes increasingly difficult to maintain the desired signal-to-noise ratio for any given head-end output as the system is lengthened.

One obvious solution would be to increase the signal level from the head-end before the trunkline amplification process begins. However, this method will not be successful past certain limits, since at very high signal levels overload occurs. At such a point distortion rapidly increases.[13]

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[10]Simons, op. cit., pp. 14-17.

[11]The signal-to-noise ratio is the difference between the signal level, measured in dBmV and the noise level, also measured in dBmV at any given point in the system. See Simons, op. cit., page 13. The term dBmV stands for decibel-millivolts. The decibel (or tenth of a bel) is an expression of the ratio between the strengths of the input signal and the strength of the output signal. The dBmV is an expression of the signal strength above a certain standard level (1 millivolt/75 ohms). (See Simons, op. cit., pp. 1-3)

[12]Reinfelder, op. cit., p. 23.

[13]Ibid., p. 24.

The over-all system length that can be achieved will depend upon several factors--the quality of the system's components (since less expensive and poorly installed components add noise), the standards the cable operator wishes to maintain at the end of his system, external factors such as the temperature range in the community, etc. Obtaining maximum system length has turned into very much of a science; however it is generally felt that 22 dB spacing between amplifiers (or placing the cascaded amplifiers every 1400 feet for foam dialectic cable or every 3000 to 4000 feet for air dialectic coaxial cable) gives optimal results[14] (but nearly all cable systems employ the foam dialectic). At the very maximum, seventy-five amplifiers have been cascaded giving thirty miles of trunk cable,[15] but normally a maximum of 17 trunk miles is placed on system length in order to maintain high standards.

It may be well to point out that there is no limit on the number of trunk lines that may be run from the head-end. Were it feasible to erect a head-end in the centre of the city, it would be possible to run trunk lines like spokes in a wheel to all points in the city, covering a radius of 17 miles from the centre. However, the positioning of the head-end is critical, and reception difficulties generally

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[14] TV Communications, Dec. 1968, p. 74.

[15] W. G. Pither. "Relay Systems in Canada", Canadian Telephone and Cable Television Journal, Dec. 1969, p. 16.

mean that the head-end must be located elsewhere. The largest cable systems (eg. those in Montreal and Vancouver) employ multiple head-end sites.

Cable television systems suffer from a further limitation, in addition to that of system length, namely useable spectrum. Table II-1 shows the allocation of spectrum to television broadcasting.

Table II-1. Allocation of Frequency Spectrum

Frequency (MHz)	Uses
0.55 - 1.60	Standard broadcast
1.60 - 54.0	Marine, aircraft, shortwave, mobile
54.0 - 88.0	VHF-TV, channels 2 to 6
88.0 - 108.0	FM radio
108.0 - 174.0	Aircraft, amateur, mobile
174.0 - 216.0	VHF-TV, channels 7 to 13
470.0 - 890.0	UHF-TV, channels 14 to 84

Source: deMercado, op. cit., p. 20.

It will be noted that a large gap exists between the frequencies allocated to the low band VHF channels (channels 2 through 6) and the high band (7 through 13). These bands were chosen in deference to the second harmonics distortion of television channels.[16] Whenever more than one television

[16] TV Communications, June 1968, p. 94.

channel (frequency) is receivable in an area (or is being carried on a cable), these signals will interact to produce signals at certain frequencies differing from the original frequencies--new signals will be produced at the frequency which is the sum of the two original frequencies, and at the frequency which is the difference of the two original frequencies and also at frequencies which are twice each of the original frequencies.[17] The standard channel frequency assignment is such that "if one takes any pair of picture carrier frequencies in the standard 12-channel assignments, their sum or difference does not fall in any of those channels."[18] In fact, such unwanted signals resulting from this "second-order distortion" fall below and between the bands. However, were a cable television system attempting to increase the number of channels on the system by adding channels at mid-band (i.e. between channels, 6 and 7), it would run into all the difficulties described above.

Third order distortion or cross-modulation presents a serious problem in CATV systems, and forces a trade-off between the number of channels carried and the length of the system. While some components of third-order distortion fall at new frequencies in a similar manner to second-order distortion, cross-modulation, a particular type of third order

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[17] Simons, op. cit., p. 27.

[18] Loc. cit.

distortion results in disturbances at the original frequencies[19] ("windshield wiping effect"[20]). This results from the transference of variations or modulations from one channel to any other channel going through the same amplifier.[21] "When this form of distortion is present, the modulation of an undesired interfering signal appears as modulation of the desired signal, and it can in no way be separated from the desired modulation ... cross-modulation products are proportional to the square of the signal levels."[22]

From the above, it is apparent we have come full circle. The greater the number of channels being carried, the greater the number of cross-modulation products. The lower the signal level of these channels passing through the amplifiers, the lower the levels of the cross-modulation products, and hence the greater the number of channels that may be carried. However, this decreases the signal-to-noise ratio and in turn decreases system length.

It may also be pointed out that cross-modulation increases as the number of amplifiers in cascade increases (i.e. as the length of the system increases) which further

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[19] Ibid., p. 28.

[20] Reinfelder, op. cit., p. 14.

[21] Simons, op. cit., p. 29.

[22] Reinfelder, op. cit., p. 43.

limits the length of the system.[23]

One further point should be made regarding the number of channels that may be carried on a CATV system. Technology has limited the useable spectrum of coaxial cable to below the 300 MHz range, which means the UHF channel frequencies cannot be used on coaxial cable since the signals at these frequencies attenuate too quickly.[24] This is the reason why UHF channels that are carried on cable systems are generally first converted to VHF frequencies.

The above is not intended to disparage cable as a potential multi-channel carrier. More channels may be added by carrying some at the mid-band and other non-broadcast frequencies, while not carrying channels at the normal broadcast frequencies. Similarly, much depends upon the quality of the amplifiers and technical improvements in them. The above serves only to show that as a CATV system's length is increased past a certain point, costs will theoretically increase at a faster rate than system size if the system's performance is to be maintained, and this fact has implications on optimal system size.

II. Construction Costs

Having described the theoretical or technological reasons that would lead one to believe that the economies of

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[23] Simons, op. cit., p. 44.

[24] TV Communications, Dec. 1968, p. 83.

scale of cable television systems are not inexhaustible, the discussion turns now to an analysis of the actual costs of establishing a cable system. This is followed in the next section by a discussion of cross-sectional data of operating CATV systems.

In these sections, certain materials have been obtained from confidential sources. Hence the source of the data and the operations these data describe are not revealed. However, the type of operation or field of endeavour of these sources are, in general, noted.

The following material was provided by a major CATV construction or "turn-key" company. Such firms build cable systems, often supplying the equipment, for the CATV companies that will operate the system upon completion of construction.

A CATV system in the first instance consists of two parts--the head-end and the transmission system. The CATV transmission system can be divided into four elements both for purposes of implementation and cost analysis:

(i) transmission system equipment, including amplifiers, power supplies, passive devices such as splitters, etc.

(ii) cable for trunk line and distribution.

(iii) construction and field engineering, including labour, pole and strand hardware (such as clamps, bolts, etc.), pedestals and associated hardware for underground work.

(iv) subscriber plant, including drop cable and associated connectors, ground blocks, transformers, etc. These

costs are generally quite constant per subscriber for all systems and are generally treated as capital improvements as subscribers are added (rather than being immediately written-off as an expense). Since these costs are not incurred during the instalation of the cable system, but after the system has commenced operations, they will not be treated here.

The costs of the transmission system equipment and cable for trunk line and distribution plant are quite predictable in the planning stages, and total costs will depend for the most part only upon system length and the quality of the materials used. As previously noted, the greater the system length, in general, the higher the quality of materials that must be used.

Twelve channel trunk amplifiers range in price from $475 each to $630 each (U.S.). Cable costs depend upon the size, quality and quantity required, so that larger systems obtain a cost-saving through large orders. The lowest priced cable will range from $120 per thousand feet (for quantities up to 100,000 feet) to $92 per thousand feet (for amounts over 500,000 feet) while the more expensive cable will cost between $292 and $219 per thousand feet for these same lengths (U.S.).

In estimating the total cost per mile of laying cable and instaling electronics, one cable construction company put the costs at an average of $3500 mile, aerial, with the

important proviso that a greater than average number of homes per mile would increase per mile costs.

Another cable construction company gave estimates of the per mile costs for the erection of strand and cable plant, including all associated pole hardware and the installation of amplifier housings only, as well as passive devices, as the following, depending upon the quality of the cable used: $2,105/mile; $2,355/mile; $3,363/mile; $4,404/mile. To the above must be added the costs of the amplifiers themselves.

Planing costs are often quoted on a per mile basis.

"Make-ready" work, usually performed by the telephone company, involves clearing or re-arranging the wires on the poles, and generally per mile costs vary according to the conditions in the particular city, rather than the length of the plant. Similarly, it is quite significant that of the factors listed as affecting the costs of per mile construction supervision (eg. size and number of crews, co-operation of the municipality and its residents, availability of equipment and cable) the total length of plant is not mentioned.

Table II-2 presents a construction cost summary for a Canadian cable system consisting of 260 miles of plant, passing, when completed, 24,391 homes and 15,321 apartment suites. Total construction was planned to be completed within a seventeen month period. It should be emphasized that these data are derived from only one project with its inherent

Table II-2. Construction Costs of a CATV System

Estimated Total Plant Miles	
Trunk and distribution	259.1
Trunk to city	1.5
	260.6
Cable, Strand and Hardware	
Cable erection, incl. cable, labour, tools, transpt. 259.1 miles at $2.729.48 per mile	$707,208
Trunk 1.5 miles at $6,133.00 per mile	9,199
	$716,407
Electronic Distribution Equipment	
Equipment--259.1 miles at $1900 per mile	$492,290
Labour--259.1 miles at $100 per mile	25,910
	$518,200
Engineering (system design and layout)	
259.1 miles at $50 per mile	$12,955
Energizing and Balancing System	
259.1 miles at $150 per mile	$38,865
Remote Antenna Site	
Land	$ 2,000
Prefrabricated building	4,000
Parabolic antenna	35,000
Misc. hardware, traps, filters, antennae	3,000
Power provision	10,000
Demodulators	5,025
Labour	2,000
	$61,025
Local Antenna Site	
Antennae	$ 4,800
Hetrodyne units	6,000
Modulators	6,700
Misc. hardware, traps, filters, antennae	2,500
Labour	3,000
	$23,000
Studio Equipment	
Cameras, projectors, video control, audio lighting systems	$75,000
Labour	4,000
	$79,000
Total Estimated Construction Costs	
Land and buildings	$ 6,000
Distribution system	1,443,452
Contingency reserve	144,345
	$1,593,797

Source: confidential

characteristics, and so may not be representative of industry costs. An accompanying Table II-3 shows the estimated capital expenditures on a per month basis for the seventeen month construction period, accompanied by the projected miles of plant and number of houses and apartment suites passed by the cable during these months.

Table II-4 is adopted from Table II-3 and puts capital expenditures on a per mile basis for each of the seventeen months. Not included in Table II-4 are the capitalised connection charges. There are several reasons for this. First, while the drop connections to the individual homes and apartments do represent a capital improvement and increase the value of the system, they represent a marginal cost of adding subscribers to an already existing cable system, rather than giving any information as to the cost of increasing the system length itself. Second, while making accurate cost predictions may, in some instances be difficult, these drop expenditure estimates also involve projections on the number of subscribers for each given month, and for this reason the results would tend to be more accurate without them. Third, since these costs are estimated as being constant per subscriber (here, $27 per residential connection) their inclusion would not affect changes in marginal costs of extending the cable plant, except insofar as there is a non-constant rate of subscriber hook-up. Since this (ie. a non-constant rate) is in fact the case in Table II-3, and subscribers are not



Table II-3. Capital Expenditures Per Month in Building a Cable Television System

Month	1	2	3	4	5	6	7	8	9
Miles constructed	9	12	12	14	14	13	12	20	21
homes passed (new construction)	1063	1237	1192	919	967	1302	1411	1494	1700
suites passed (new construction)	1732	1012	977	1936	1575	1011	1080	737	840
total homes and suited (new const.)	2795	2249	2169	2855	2542	2313	2491	2231	2540
Capital Expenditures ($,000)									
1. cable, strand, hardware	25	33	33	38	38	35	42	55	57
2. electronic distribution-equip.	19	26	26	30	30	29	27	32	43
3. engineering (system design and layout)	1	1	1	1	1	1	1	1	1
4. energizing and balancing	1	1	2	2	2	2	3	2	3
5. remote antenna sites				20	20	15			
6. local antenna site			20	3					
7. studio equipment									
8. 10% contingency allowance	5	6	8	9	9	8	7	9	10
TOTAL-DISTRIBUTION SYSTEM	51	67	90	103	100	90	80	99	114
Connection Charges Capitalized ($,000)									
9. residential connections at $27									
10. extra outlets at $10							44	8	10
11. suite connections at $20							3	1	
OTHER ($000)									
12. land		2							
13. building			4						
14. electronic test and repair equip.	10	5			5				
15. automotive and servicing equip.	1								
16. furniture and fixtures	5		5		5				
TOTAL CAPITAL EXPENDITURES	67	74	99	103	100	100	127	108	124

Source: confidential

continued

Table II-3, continued

Month	10	11	12	13	14	15	16	17	Total
Miles constructed	16	17	18	13	12	20	15	21	259
homes passed (new construction	1598	1131	1200	1227	2138	2689	1664	1459	24,391
suites passed (new construction)	2041	200	130	229	209	961	446	205	15,321
total homes and suites (new const.)	3639	1331	1330	1456	2347	3650	2110	1664	39,712
Capital Expenditures ($,000)									
1. cable strand, hardware	44	46	49	35	33	55	41	47	716
2. electronic distribution-equip.	34	36	38	27	24	30	31	36	518
3. engineering (system design and layout)	1	1	1	1					13
4. energizing and balancing	2	3	3	2	2	3	3	3	39
5. remote antenna sites									55
6. local antenna site									23
7. studio equipment				26	26	27			79
8. 10% contingency allowance	8	9	9	9	9	12	7	10	144
TOTAL-DISTRIBUTION SYSTEM	89	95	100	100	94	127	82	106	1,587
Connection Charges Capitalized ($000)									
9. residential connections at $27	9	6	6	11	17	22	16	16	165
10. extra outlets at $10	1		1	1	1	2	1	1	12
11. suite connections at $20				4	4	4	4	4	20
OTHER ($000)									
12. land									2
13. building									4
14. electronic test and repair equip.									20
15. automotive and servicing equip.								3	4
16. furniture and fixtures									
TOTAL CAPITAL EXPENDITURES	99	101	107	116	116	155	103	130	1,829

Table II-4. Marginal Construction Costs of a CATV System

Month	1	2	3	4	5	6	7	8	9	10
Costs Per Mile of Plant ($000)										
1. cable, strand, hdw.	2.78	2.74	2.74	2.71	2.70	2.70	3.50	2.76	2.72	2.75
2. elec. distrib. equip.	2.11	2.08	2.08	2.14	2.14	2.22	2.24	1.60	2.05	2.12
3. engineering	0.11	0.08	0.08	0.07	0.07	0.07	0.08	0.05	0.05	0.06
4. energizing and balancing	0.11	0.08	0.16	0.14	0.14	0.15	0.25	0.10	0.14	0.13
5. 10% contingency	0.51	0.50	0.51	0.51	0.51	0.51	0.61	0.45	0.50	0.51
TOTAL	5.62	5.48	5.57	5.57	5.56	5.65	6.68	4.96	5.46	5.57
6. electronic equip.	1.11	0.42	0	0	0.34	0	0	0	0	0
7. automotive	0.11	0	0	0	0	0	0	0	0	0
TOTAL	6.84	5.90	5.57	5.57	5.90	5.65	6.68	4.96	5.46	5.57
Two Month Average of Total		6.37	5.74	5.57	5.74	5.78	6.17	5.82	5.21	5.51

Source: confidential

continued

Table II-4, continued

Month	11	12	13	14	15	16	17
Costs Per Mile of Plant ($000)							
1. cable, strand, hdw.	2.70	2.72	2.70	2.74	2.50	2.73	2.72
2. elec. distrib. equip.	2.12	2.11	2.08	2.00	1.50	2.06	1.72
3. engineering	0.06	0.06	0.07	0	0	0	0
4. energizing and balancing	0.18	0.17	0.15	0.17	0.15	0.20	0.14
5. 10% contingency	0.51	0.51	0.50	0.49	0.42	0.50	0.46
TOTAL	5.57	5.57	5.50	5.40	4.57	5.49	5.04
6. electronic equip.	0	0	0	0	0	0	0
7. automotive	0	0	0	0	0	0	0.18
TOTAL	5.57	5.57	5.50	5.40	4.57	5.49	5.22
Two Month Average of Total		5.57	5.53	5.45	5.49	5.53	5.35

hooked up until the seventh month (86 miles of plant laid) it is obvious the inclusion of connection charges would distort the results since they bear no correlation to the system length, but rather take place more or less at the whims of the cable operator and his subscribers.

Similarly land, building and furniture and fixtures costs are not included since they bear no obvious relation to the per mile cost. This same rationale is used to eliminate the antenna site and studio equipment costs. The contingency cost is reduced to 10% of the remaining costs.

It is readily apparent from an examination of Table II-4 that there is no discernible trend in the extra costs of lengthening the sample CATV system. When electronic test and repair equipment and automotive and sales equipment (divisible costs, yet much more of a lump sum nature than the other costs in Table II-4) are included, the first month of cable construction is found to be relatively expensive. Of the truly divisible costs (ie. items one to five), cable strand, and hardware shows an unexpected rise in month 7 and then returns to normal, while the remaining items show a drop in month 8 before returning to normal. There is also a certain instability in month 16 due chiefly to the large fall in per mile costs of electronic distribution equipment.

Months seven, eight and sixteen are not atypical, either as to miles of plant installed or number of houses passed. These fluctuations in costs can only be attributed to some

inherent characteristics of the area in which construction is taking place at these times. This is an important finding--if construction costs fluctuate substantially for a single system as the system is extended in area within a municipality, it can be expected that there will be significant variations in construction costs per mile as systems built in different municipalities are studied.

The apparent downward trend in engineering costs may reflect a learning process in CATV system construction.

In order to further investigate the construction costs of CATV systems, a CATV construction engineer and designer was interviewed, and his figures passed on to others in the field for comments. The costs presented below were generally felt to be reasonable.

The per mile estimated cost of instaling distribution cable (not including trunk cable) without the electronics was felt to range from a maximum of $1900 per mile to a minimum of $1300 per mile, with an expected mean of about $1480 per mile. Of these amounts, cable would account for roughly 30% of the per mile cost, the associated hardware 25%, engineering 5% and labour (including both man-hours and vehicle-hours) about 40%.

The electronics for the distribution plant, which includes amplifiers, multitaps, and line splitters, would range in cost from a maximum of $2400 per mile to a minimum of $1600 per mile. The main factor determining where in this

range a particular system finds itself is population density, but other relevant variables will include temperature ranges, average humidity, type of cable and the number of channels being carried (due to cross-modulation).

For trunk cable (without electronics) costs will range from $2900 per mile to $2300 per mile for aerial plant; $4000 to $3000 for duct instalation where ducts are available; and $10,500 to $3000 for underground (buried) cable. Electronics for the trunk would range between $3500 and $2000, depending on the factors above. For each 100 miles of total plant, generally 70 to 88 miles will be distribution cable and 30 to 12 miles trunk cable.

The engineer further estimated that for any system with over fifty miles of plant, the first 20% of the total system would generally be installed at the maximum figures quoted above, and that after 40% of the system had been built (for systems over 50 miles) all economies of scale would have disappeared and costs per mile would be at the average for the whole system.

By applying these estimates to the sample system of Tables II-3 and II-4, one would expect a steady decline in per mile costs to the end of the eighth month. In fact the average monthly per mile cost (where each month rather than each mile is given equal weight) for the first five items of Table II-4 is 5.64 thousands of dollars per mile for the first eight months and 5.35 thousands of dollars per mile for the last nine months. The extraordinarily low average cost of $4.96

thousands per mile also occurs in the eighth month, and if the averages are taken for the first seven months of construction (33% of the construction completed) it is found that the average monthly per mile cost is $5.73 thousands compared to $5.31 thousands for the last ten months (67% of construction).

It may be concluded that the data drawn from the single CATV system tend to support the hypothesis that any economies of scale in building a CATV plant are realised during the early miles of construction.

It may be well to draw attention to what we have and have not established. We have established that if economies of scale in building a cable system exist, they tend to vanish at a fairly early rate (probably after 20 miles of plant have been built for a 50-mile system). We have found no indication of the existence of diseconomies of scale. However this does not contradict the theoretical reasons for supposing that diseconomies exist. The relevant data for analysis in this regard is not primarily costs for a single system, but rather costs across systems of varying sizes. In planning a large CATV system, one would expect the per mile cost to be higher per mile <u>throughout</u> the large system than those for small and medium sized systems in which technical problems are not so important. Had diseconomies been found in the construction costs of the single sample system, this would have, of course, reinforced the theoretical suppositions regarding diseconomies; however their absence does not deny their existence. And it

is significant that no economies of scale were found to exist once one-third of the system had been established.

To test the hypothesis regarding optimal system size the discussion turns to a cross-sectional analysis of the fixed assets of a sample of cable systems.

III. Cross-Sectional Data on the Economies of System Size

From financial statements of operating cable television companies, ranging in size from the very smallest (18 miles of cable) to the largest (over 1000 miles of cable), Table II-5 was developed in an effort to assess the importance of system size on capital invested in CATV firms.

However, before proceeding, certain explanations are required.

In many cases, the cable television firms are forbidden from owning the coaxial cable by the telephone companies if the former wish to use the telephone company poles. In general, CATV firms do own the electronic equipment (amplifiers) and the house drops. Fortunately, for purposes at hand, however, the telephone companies require the CATV firms to pay for the cable and construction costs, and they then lease the cable back to the cable companies over a long (10-year) period. This cable then, although not owned by the cable companies, is an asset for which they have paid, and it may be depreciated over the life of the lease. Also, the 10-year lease agreement coincides well with the estimated useful life of the distribution system for companies that do own the cable.

Therefore, it has not been necessary to adjust the assets due to the ownership of the cable. The chief difficulty in proceeding in this manner is that cable firms forced into these "leaseback" arrangements with the telephone companies may face higher construction and equipment costs than they would were they free to build the systems themselves. This possibility is investigated in some detail in Chapter III; however, in the present analysis, the possible cost disadvantage faced by such firms is not treated, and so the results will be biased to the extent that (a) exploitation by the telephone companies through leasebacks does in fact take place to a significant extent, and (b) only large cable firms or only small cable firms (but not both) in the sample are forced into such contractual arrangements.

A second area requiring clarification involves the capitalisation of house drops. Three of the companies treat these drop costs as an operating expense, while the rest treat them as an improvement to the system and depreciate them over (generally) five years.

Presently, accountants estimate drop costs (including both labour and materials) at $25 to $30 each. In order to account for rising costs of making these house drops over time, I have costed them at a probably unrealistically low figure of $22 each. As explained earlier, it is more meaningful for present purposes to treat these costs as an expense to be written off than as a capital improvement. Were drop

costs included in the asset table, it would be found that, for two systems of equal length and equal capital investment except for drop costs, the system with the higher saturation of subscribers would have the higher costs. Subscriber saturation will depend not only upon the quality of equipment (which is relevant) but on other exogenous factors, such as the number and affiliation of channels attainable with an outdoor antenna.

For the sake of consistency in treating all systems, both for systems that have listed house drops separately in the balance sheets and for systems where house drops are submerged into a broader asset category such as "distribution line and equipment," the current number of subscribers to the CATV system is multiplied by $22.00 and this amount is subtracted from the total assets.[25]

A third difficulty has presented problems with which it has not been possible to adequately cope. Apparently, it is the practice of some CATV operators to retain undepreciated, obsolete assets in their balance sheets, even after the systems, or parts of the systems have been re-built. It was impossible to obtain information regarding the significance

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[25]While $22 is undoubtedly a low cost for drop charges to-day, it does account for the inflation of such costs over the years. The actual cost given to drop instalations in no way affects the conclusions reached on economies of scale for CATV, since the analysis uses the constant drop charge ($22) for all systems, regardless of size.

of this possibility for some of the systems in the sample used. If such practice is prevalent among such systems, costs will be inflated, and the reliability of the results presented below will be reduced.

Finally, current assets (cash, accounts receivable, inventory, etc.) are not included in Table II-5, nor is "good will". All assets are valued at original cost, and no account has been taken of accumulated depreciation. Depreciation will be treated later.

The results of Table II-5 are shown in Figure II-1, and a break-down of the assets for those companies from which a detailed break-down was made available is shown in Table II-6.

Even without adjusting the figures for the three companies for whom the head-end costs were not included in Table II-5 (i.e. companies A, H, J,,L), Figure II-1 shows a sharp upward trend in average fixed capital invested per mile as the size of the system increases. Those firms with less than 250 miles of distribution cable tend on average to have $4500 to $6000 invested per mile of plant, while firms with over 300 miles of distribution cable tend to have invested between $7500 and $10,000 per mile of plant. These data support the theoretical reasoning given in section I of this chapter, and indicate strong diseconomies of scale.

Alternative measures of system size that may be employed are number of potential subscribers (defined as the number of homes passed by the cable) and the number of actual subscribers.

Table II-5. Fixed Assets Per Mile of Plant for Various CATV Firms (Drop Costs Excluded)[1]

Company	Miles of Cable	Total Fixed Assets Per Mile
A	18	$5003.722[3]
A[2]	18	$5003.722[3]
B[2]	55	$5669.873
B	74	$5102.568
C	75	$3118.200
D	89	$5868.449
E[2]	150	$5872.013
F	180	$6578.350
G[2]	185	$6288.324
H	200	$6016.385[3]
G	256	$5345.656
I[2]	327	$8510.969
I	380	$7737.644
J	472	$3940.669[3]
K	700	$9329.030
L	700	$7955.714[3]
M[2]	1000	$10,736.903
M	1050	$9430.235

Source: confidential

[1]All costs are for 1969 unless otherwise noted.

[2]1968 costs.

[3]Head-end leased from outside source. Costs are biased downward.

Figure II - 1

Fixed Assets Per Mile Of Plant For Various CATV Companies.

Source: Table II-5

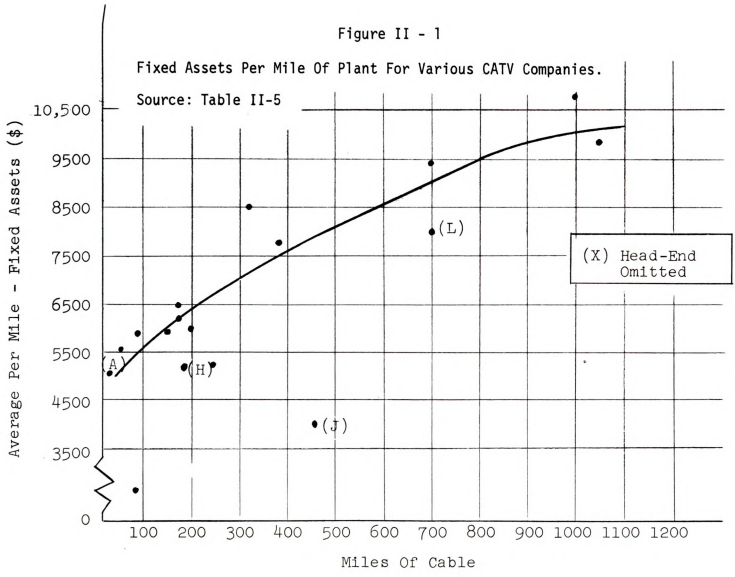


Table II-6. Fixed Cost per Mile of Plant for Five CATV Companies (Drop Costs Excluded), 1969.

Company	E[1]	F	G	H	J
Miles of Plant	150	180	256	200	472
Category of fixed asset					
1. distribution line equipment	$2154.080	$2714.989	$1855.371	(see item 2)	(see item 2)
2. main distribution cable	2901.667	2245.294	2576.918	$5349.546	$3700.051
3. test equipment		127.217		83.145	73.912
4. Antennae, head-end site	140.213	1280.861	304.875	antenna leased	antenna leased
5. office and equipment	68.333	59.189	154.215	216.610	79.983
6. trucks	131.606	73.850	124.297	184.374	21.506
7. buildings	9.405	44.156		17.244	7.479
8. land	121.371	31.794		95.000	
9. other (studio, lease improvements, etc.)	11.523		329.980	70.462	57.738
TOTAL	$5538.198	5578.350	5345.656	6016.387	3940.669

Source: confidential

[1]1970 costs

Calculations have been made placing fixed assets on a per potential subscriber basis and these are shown in Table II-7, and Figure II-2. Once again, the detailed breakdown of assets is presented for those companies who made such information available (Table II-8).

An examination of Table II-7 and Figure II-2 reveals that fixed investment per potential subscriber tends to fall as the size of the cable system (as defined by the number of potential subscribers to the system) grows. This is a reversal from the theoretical expectations and from empirical results as obtained by placing these fixed investment figures on a per mile of plant basis.

Column four in Table II-7 shows the percentage saturation for each cable system. Were any of the fixed assets (besides drop costs which again have been removed from the figures) to vary positively with the number of actual subscribers, it would be expected that cable systems with the lowest subscriber saturation would be the low cost firms on this basis.

Before taking account of the possible influence of a low percentage of actual subscribers to potential subscribers, it will be noted that all economies of scale derived by using the above measure appear to be exhausted at a potential subscriber size of 40,000, after which costs per potential subscriber are fairly constant. Forty thousand potential subscribers is equivalent to about 180 miles of plant. Whereas in Table II-5, invested capital continued to rise on

Table II-7.[1] Fixed Assets Per Potential Subscriber (Excluding Drops) for Various CATV Systems

Company	Number of Potential Subscribers	Fixed Assets Per Potential Subscriber	Percentage Saturation
A[2,3]	985	$ 91.439	81
A[3]	992	90.793	88
N	5,075	102.300	58
B[2]	5,980	52.148	40
B	6,178	61.118	54
C	7,000	33.410	71
D	12,500	41.783	73
E[2]	14,400	61.166	37
O	16,900	74.944	50
I[2]	34,979	84.059	48
I	37,197	79.045	55
F	42,500	27.851	31
G[2]	43,407	26,800	34
G	45,725	29,928	54
J[3]	62,700	29,665	58
L[3]	171,000	33.362	21
K	177,000	36,894	67
M[2]	396,000	27,113	12
M	408,000	24.268	18

Source: confidential

[1] All data for 1969, except where otherwise noted.

[2] 1968 data.

[3] Head-end leased; not owned by company and so not included in the Table.

Figure II - 2

Fixed Assets Per Potential Subscriber
For Various Sized Cable Firms; Drops Excluded)

Source: Table II-7

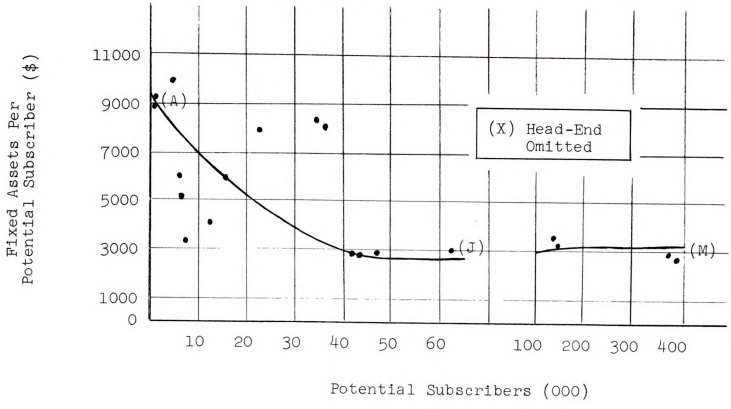


Table II-8. Assets per Potential Subscriber for Selected CATV Firms--1969 (Drop Costs Excluded)

Company	E	F	G	J[1]	L[1]
Potential Subscribers	14,400	42,500	45,725	62,700	171,000
Category of fixed asset					
1. distribution line equipment	$25.916	$11.499	$10.388	see item 2	$13.777
2. main distribution cable	30.226	9.514	14.427	$27.854	17.000
3. test equipment		0.539		0.556	
4. antennae, head-end site	1.461	5.425	1.707	not owned by firm	not owned by firm
5. office and equipment	0.712	0.251	0.863	0.602	
6. trucks	1.371	0.313	0.696	0.162	0.509
7. buildings, land	1.362	0.322		0.056	0.070
8. other	0.120		1.847	0.435	2.006
TOTAL	$61.168	$27.863	$29.928	$29.665	$33.362

Source: confidential

[1]Head-end not owned.

a per mile basis for systems larger than 180 miles of cable (and, correspondly, 40,000 potential subscribers), by Table II-7 these investment costs appear fairly constant for systems beyond this size when measured on an average per potential subscriber basis.

In an effort to take into account the effects of low saturation on average investment per potential subscriber, Figures II-3A, II-3B, and II-3C are presented in which saturation ratios in the three diagrams are 0-40%, 30-60%, and 50-100%, respectively.

The shapes of the three curves are quite similar--all slope downward to the right at small plant sizes; all appear to flatten out at around 40,000 potential subscribers, and in cases in which there is a low to medium saturation (for systems greater in size than 40,000 potential subscribers), total fixed investment in the system is only $25 to $28 times the number of potential subscribers. For highly saturated systems, investment costs are somewhat higher for large systems, averaging $25 to $40 per potential subscriber.

It then appears that for cable systems beyond a certain size (30,000 to 40,000 potential subscribers), the size of the system is fairly independent of the amount of fixed investment per potential subscriber. Economics of scale do seem to exist for all firms smaller than this size, however.

In order to test the hypothesis that the lower costs per potential subscriber for large systems can be explained

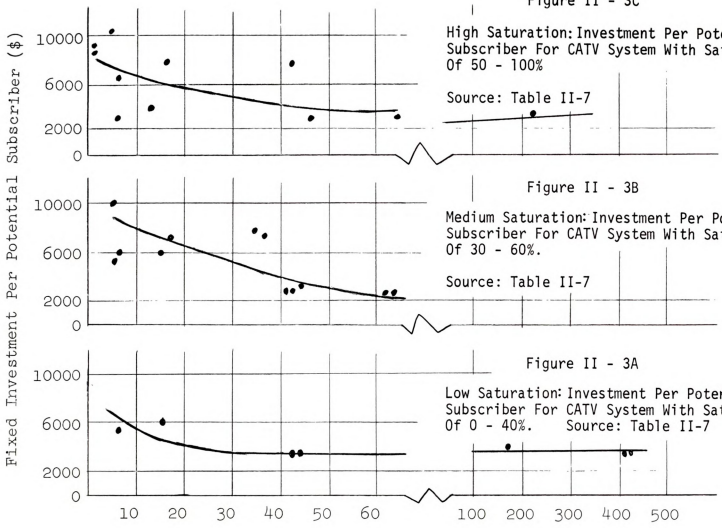


Figure II - 3C

High Saturation: Investment Per Potential Subscriber For CATV System With Saturation Of 50 - 100%

Source: Table II-7

Figure II - 3B

Medium Saturation: Investment Per Potential Subscriber For CATV System With Saturation Of 30 - 60%.

Source: Table II-7

Figure II - 3A

Low Saturation: Investment Per Potential Subscriber For CATV System With Saturation Of 0 - 40%. Source: Table II-7

simply by the higher population density per mile for these larger systems (due to high rise apartments, for instance), Table II-9 is developed, which shows the average number of potential subscribers per mile of plant and average fixed investment per potential subscriber for the sample CATV systems. The results of Table II-9 are shown in Figure II-4.

From these data it is obvious that high density of (potential) subscribers per mile will afford cable television companies substantial cost savings. These results are significant, not only because they help explain the unexpected behaviour of average fixed assets curve when measured on a potential subscriber basis, but also will have implications with regard to the desirability of over-wiring areas.[26]

The effects of population density can be removed by classifying cable companies as is done in Table II-10 which employs two classes--below 150 and above 150 potential subscribers per mile. As can be seen by inspecting Figures II-5A and II-5B, classifying CATV as to density in this way removes the strong downward bias resulting from the unclassified data. By having such an impact in lowering capital requirements per subscriber, a high saturation of cable subscribers appears necessary for efficiency. For an average system with 100 potential subscribers per mile, the introduction of a second

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[26] "Over-wiring" is a policy which would allow one or more competitive cable firms into an area, rather than granting exclusive licences to companies.

Table II-9. Average Amount of Fixed Assets per Potential Subscriber Compared to Population Density for Various CATV Systems[1]

Company (Miles of Plant) [No. of potential subscribers]	Average Number Potential Subscribers per mile of plant	Average fixed Assets per Potential Subscriber
A[2,3]; (18); [985]	54.7	$91.439
A[3]; (18); [992]	55.1	90.793
B; (74); [6178]	83.5	61.118
C; (75); [7000]	93.3	33.410
E[2]; (150); [14,400]	96.0	61.666
I; (380); [37,197]	97.8	79.047
I[2]; (327); [34,979]	106.9	84.059
B[2]; (55); [5980]	108.7	52.148
J[3]; (472); [62,700]	132.8	29.665
D; (89); [12,500]	140.5	41.783
G; (256); [45,725]	178.6	29.928
G[2]; (185); [43,407]	234.6	26.800
F; (180); [42,500]	236.1	27,861
L[3]; (700); [171,000]	244.3	33.362
K; (700); [177,000]	252.9	36,894
M; (1050); [408,000]	388.6	24.268
M[2]; (1000); [396,000]	396.0	27.113

Source: Tables II-5 and II-7.

[1]All data for 1969, except where otherwise noted.

[2]1968 data.

[3]Head-end leased.

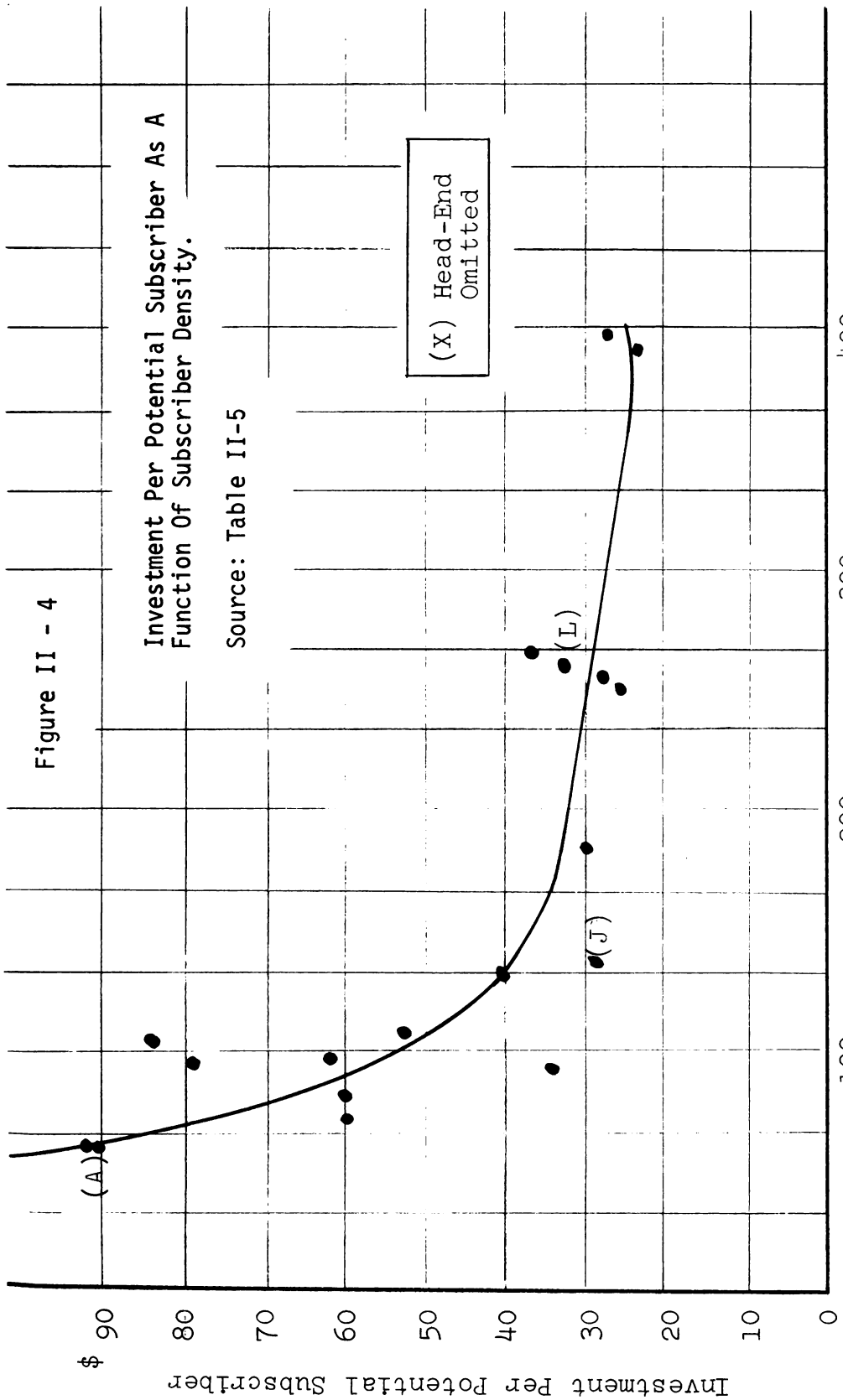

Figure II - 4
Investment Per Potential Subscriber As A Function Of Subscriber Density.
Source: Table II-5
(X) Head-End Omitted
(A)
(J)
(L)
$ 90
80
70
60
50
40
30
20
10
0
100
200
300
400
Investment Per Potential Subscriber
Potential Subscribers Per Mile

Table II-10.[1] Potential Subscribers and Fixed Investment per Potential Subscriber by Density per Mile, Various CATV Systems

Cable Company	Potential Subscribers	Fixed Assets per Potential Subscriber ($)
Density 0-150		
A[2,3]	985	91.439
A[3]	992	90.793
B	6178	61.118
C	7000	33.410
E	14,400	61.666
I[2]	34,979	84.059
B[2]	5980	52,148
J[3]	62,700	29,665
D	12,500	41.783
Density Over 150		
G	45,725	29.928
G[2]	43,407	26.800
F	42,500	27.861
L[3]	171,000	33.362
K	177,000	36.394
M	408,000	24.268
M[2]	396,000	27.113

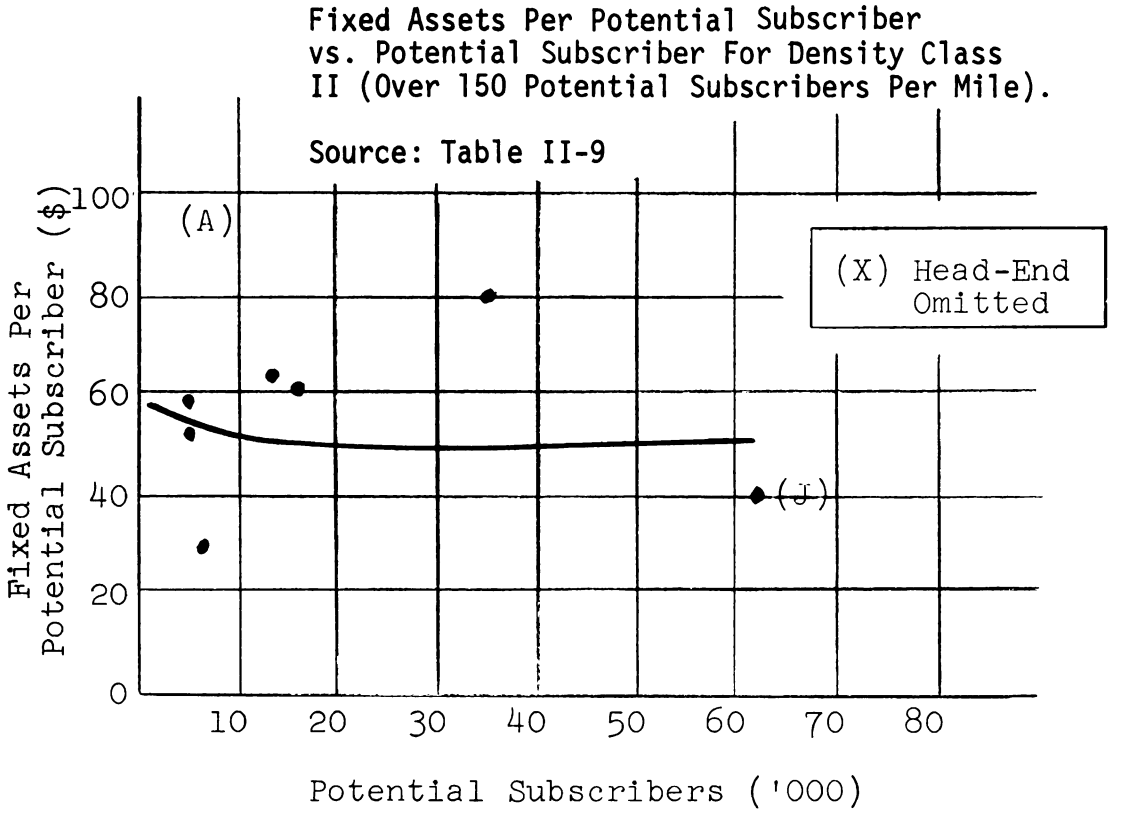
Source: Table II-9.

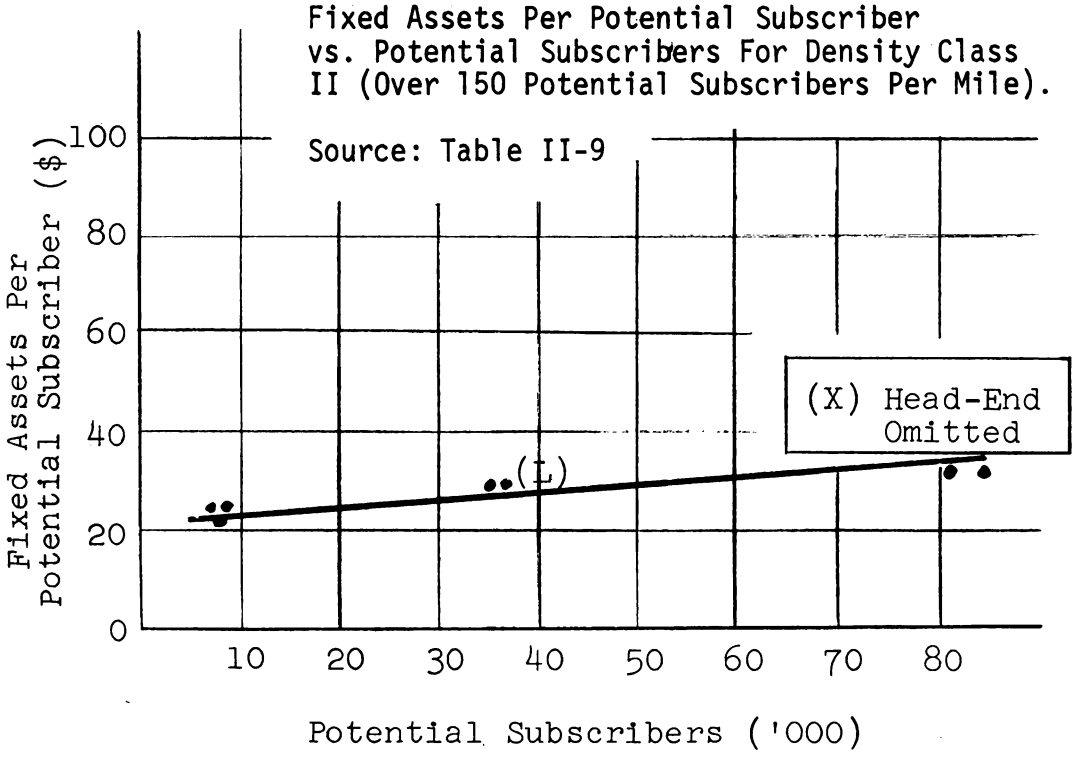
[1]1969 data, except where otherwise noted.

[2]1968 data.

[3]Head-end costs omitted.

Figure II - 5A


Fixed Assets Per Potential Subscriber vs. Potential Subscriber For Density Class II (Over 150 Potential Subscribers Per Mile).
Source: Table II-9
Fixed Assets Per Potential Subscriber ($)
0
20
40
60
80
100
(A)
(J)
(X) Head-End Omitted
10
20
30
40
50
60
70
80
Potential Subscribers ('000)


Fixed Assets Per Potential Subscriber vs. Potential Subscribers For Density Class II (Over 150 Potential Subscribers Per Mile).
Source: Table II-9
Fixed Assets Per Potential Subscriber ($)
0
20
40
60
80
100
(L)
(X) Head-End Omitted
10
20
30
40
50
60
70
80
Potential Subscribers ('000)

cable system covering the same area would raise the expected amount invested per potential subscriber from about $52 to over $90 assuming each company were equally attractive to potential subscribers (see Figure II-4). The results are not so dramatic for the largest systems. For cable systems with 400 potential subscribers per mile of plant, the effect of the introduction of a second cable company would be to raise investment from $25 to $33 per potential subscriber. The likelihood that both firms would remain in operation in such a situation may be questioned. We will return to this point later.

For the sake of completeness, costs per actual subscriber are now presented, although there are severe qualifications regarding the suitability of the measure; in fact, actual number of subscribers to a CATV system is probably the weakest measure of the system's size of the three measures that are here employed. Unlike the number of potential subscribers, this measure provides only a poor estimate of the system's capacity. The number of actual subscribers will depend on many exogenous factors (such as the number of signals and diversity of signals obtainable off-the-air as compared to the number and diversity of channels carried on the cable, the average disposable income of the area served, demographic variables such as the degree of urbanization and amount of "night life" in the community) as well as population.

Similarly, number of actual subscribers is a poorer measure of system size than miles of plant. In addition to the advantages listed above for using potential subscribers as the base measures, miles of plant possesses the additional desirable advantage of removing the variable population density from the size criterion. It provides a fairly constant measure for all systems; there are fewer exogenous factors to be accounted for in comparing particular systems.[27]

However, using the number of actual subscribers does possess one inherent advantage; it allows one to see how costs vary when the system's capacity is under-utilised. This measure is also useful when one wishes to view the profitability of cable operations.

Since drop costs vary directly with the number of actual subscribers, in Table II-11, for the first time, I have included drop costs. For the three systems that expensed these charges, once again I have used a $22.00 cost per subscriber and have added this to the figures in the balance sheet (see the discussion on page 41 regarding the selection of this (low) figure and the footnote pertaining thereto.

Table II-11, then, shows the average amount of capital invested per subscriber for a sample of CATV systems. When investment per subscriber is plotted against percentage

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[27]Wage rates, telephone company policies in the area, attitude of the municipality, residential vs. commercial regions, for example are factors to be considered, however.

Table II-11.[1] Assets Invested per Subscriber for Various CATV Systems, 1969 (Drop Costs Included)

Company	Number of Subscribers	Capital Invested per Subscriber	Percent Saturation
A[3]	871	$125.407	80
B[2]	2383	152.862	40
N	2920	199.799	58
B	3355	134.545	54
C	4980	68.961	71
E	5300	188.189	37
D	8058	86.817	73
O	8400	172.781	50
Q[2]	11,000	148.357	15
F	13,000	113.084	31
G[2]	14,389	102.849	34
H	17,013	92.727	Not avail.
I[2]	17,049	185.240	48
I	20,476	165.598	55
G	24,812	77.154	54
J[3]	36,500	72.958	58
L[3]	41,870	155.006	21
M[2]	49,404	239.329	12
M	70,269	162.912	18
K	118,700	77.015	67

Source: confidential

[1]All figures for 1969, except where otherwise noted.

[2]1968 costs.

[3]Head-end costs not included.

saturation, as is done in Figure II-6, it can be seen that there is an inverse relationship between capital invested per subscriber and the percentage saturation for the sample of CATV systems; this relationship would be expected a priori.

Instead of the continuous function drawn in Figure II-6, one may choose a discontinuous function (see dotted line in Figure II-6) from which it appears that once a cable firm attains a percentage saturation of 55 to 65%, there is a dramatic fall in investment per subscriber in the order of from $140-$180 to $70-$80 per subscriber.

In order to further investigate these apparent economies of increasing saturation, Table II-12 presents detailed average investment per subscriber data for two firms for 4 successive years, during which the firms' saturations grew from 9 to 71% and from 19 to 63%, respectively. The results are shown in Figures II-7A and II-7B. Once more the average investment per subscriber curve falls rapidly as the subscriber saturation ratio rises from low levels. And reconfirming the conclusions derived from Figure II-6 is the fact that this curve tends to flatten out for firm Y at the 55 to 60% saturation point.

Attention is now turned to operating costs for the cross-sectional sample of CATV firms. In Table II-13 an operating cost summary for a sample of 17 CATV firms is given with costs being placed on a per mile of plant basis. For several firms, such costs are presented for two years and are so denoted.

Figure II - 6

Capital Invested Per Subscriber As A Function of The Percentage Saturation Of The System

Source: Table II-11

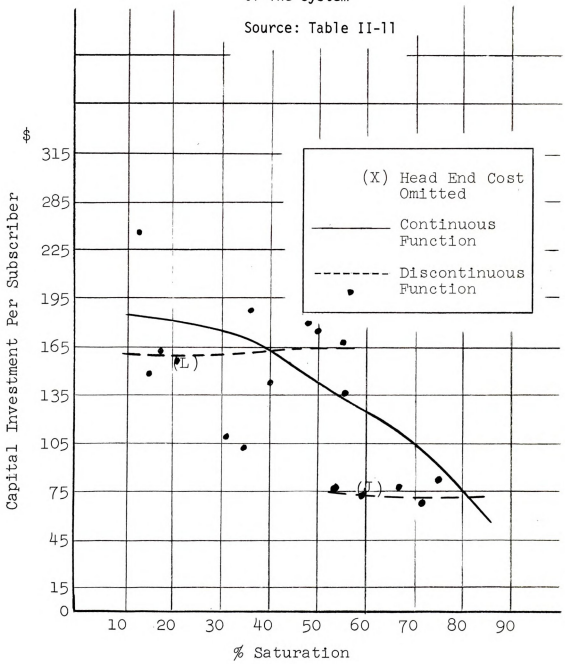


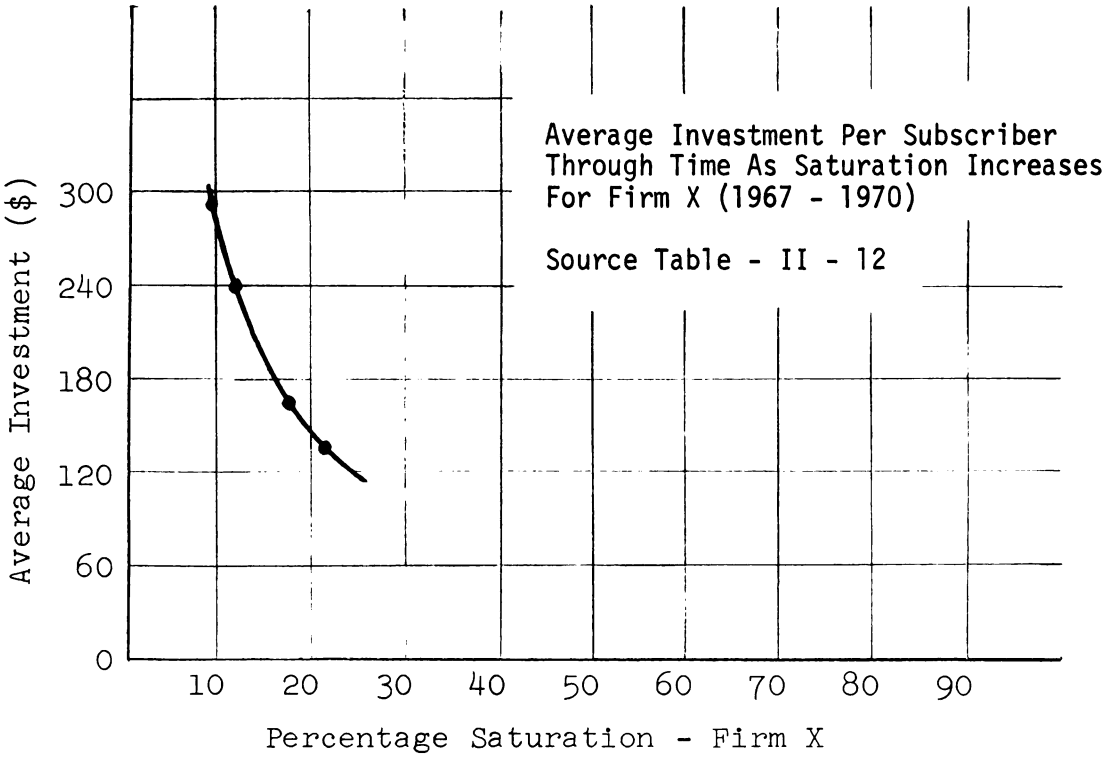
Table II-12. Assets per Subscriber Through Time for Rising Saturation Ratios for Two Sample CATV Systems (1967-1970) (Drop Costs Included)

Firm X				
Year (% saturation)	1970 (21%)	1969 (17%)	1968 (12%)	1967 (9%)
Asset				
1. Tower, distribution system		$156.662	$230.023	$269.697
2. Tools, test equipment		1.686	2.092	2.287
3. Office and equipment		0.986	1.209	1.380
4. Trucks		0.021	0.781	0.900
5. Pole rights		3.558	5.060	6.902
6. Land		0	0.163	0.225
TOTAL	$137.552	$162.913	$239.328	$281.391

Firm Y				
Year (% saturation)	1970 (63%)	1969 (54%)	1968 (34%)	1967 (19%)
Asset				
1. Cable and electronics	$36.928	$39.183	$ 53.614	$114.467
2. Antennae	2.622	3.146	5.253	25.841
3. Drop connections	27.502	28.547	34.610	52.194
4. Office and equipment	1.592	1.591	2.426	5.035
5. Trucks	1.379	1.282	1.336	4.791
6. Other	4.070	3.404	5.805	
TOTAL	$74.093	$77.153	$103.044	$202.328

Source: confidential

Figure II - 7A



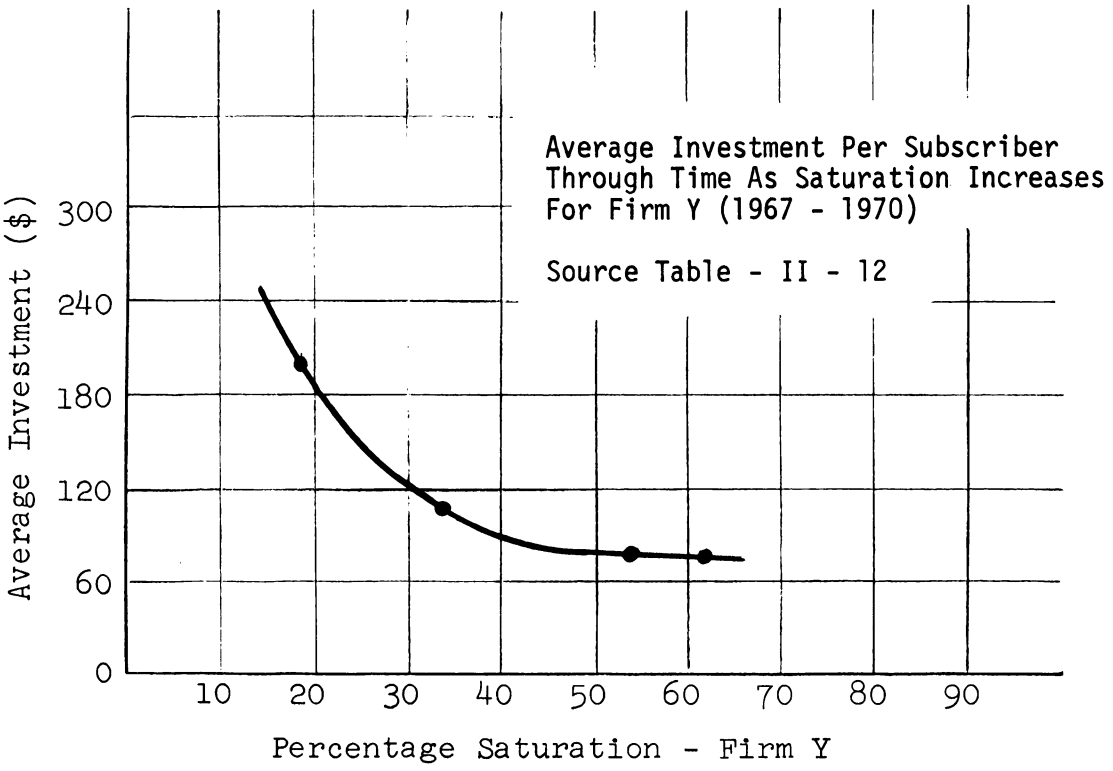


Figure II - 7B

Figure II-8 presents a graphical interpretation of Table II-13, and Table II-14 gives a complete average cost per mile breakdown of the data in Table II-13.

Once again, for companies who expensed drop costs as they occurred, rather than capitalising them and depreciating them over a period of five years, an estimate of $22.00 for each such drop has been made, and $22.00 times the number of subscribers was deducted from operating expenditures before the per mile calculations were made.

It will be noted from Figure II-8, that when a linear regression is fitted to the data of Table II-13, operating costs per mile tend to increase gently as the number of miles of plant is increased.

When a non-linear, best-fit continuous function is chosen, one finds a U-shaped cost curve. Costs appear to decline rapidly on an average per mile basis as the size of the systems grow from 18 miles to about 250 miles, and thereafter rise at a more gentle rate for systems larger than 300 miles.

If a discontinuous function is chosen (see dashed line in Figure II-8), average operating costs fall quickly for system sizes up to 150 miles of plant, and there is a jump upward for systems larger than 150 miles of plant and costs then continue to rise for plants of still greater size.

It may be concluded that all operating economies appear to be exhausted at 150 to 300 miles of plant, and systems of larger size face higher operating expenses per mile.

Table II-13. Operating Costs per Mile of CATV Plant for Selected Companies 1967-1970 (Drop Costs, Depreciation, Interest Payments Excluded)

Company	Year	Miles of Plant	Average Operating Costs per Mile
A	1968	18	$2066.000
A	1969	18	2053.333
B	1968	55	1362.138
P	1968	57	2504.315
P	1969	57	2494.959
R	1969	60	1067.232
B	1969	74	1081.892
C	1969	75	1247.748
D	1970[1]	92	1304.348
E	1968	150	837.878
T	1969	159	1579.949
F	1968	180	1675.416
G	1968	185	1709.208
H	1969	200	2206.900
G	1969	256	1749.159
I	1968	327	1616.881
I	1969	380	1329.033
S	1968	401	1666.159
J	1969	472	1338.266
S	1969	496	1951.236
K	1969	700	2316.208
L	1969	700	1343.171
M	1967	770	1983.384
M	1968	1000	1837.744

Source: confidential

[1]1970 costs pro-rated from 8 months.

Figure II - 8

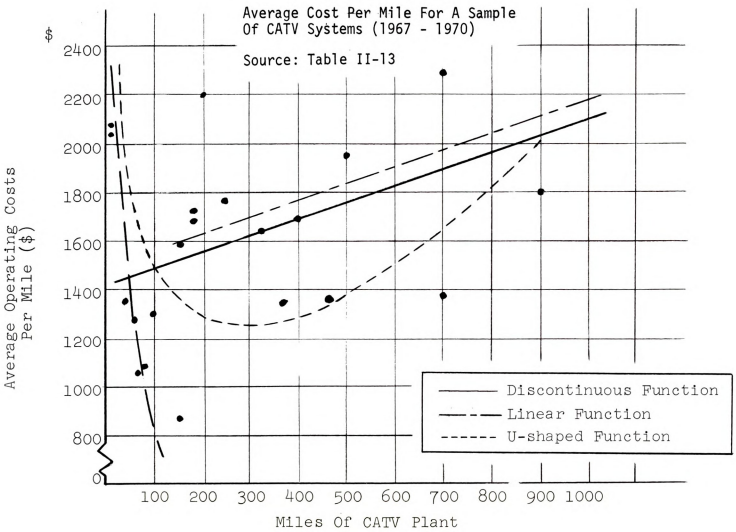

Average Cost Per Mile For A Sample
Of CATV Systems (1967 - 1970)
Source: Table II-13
$
2400
2200
2000
1800
1600
1400
1200
1000
800
0
Average Operating Costs
Per Mile ($)
100 200 300 400 500 600 700 800 900 1000
Miles Of CATV Plant
Discontinuous Function
Linear Function
U-shaped Function

Table II-14. Average Operating Expenses per Mile of Plant for Sixteen CATV Systems (Mainly 1969) (Drop Costs, Interest Payments and Depreciation Excluded)

System	A	P	R	B	C	E	T	F
(Miles of Plant)	(18)	(57)	(60)	(74)	(75)	(150)	(159)	(180)
OPERATING COSTS PER MILE ($)								
Selling Costs:								
1. sales commissions	see #3	see #3	see #3	123.946	see #3	136.146	78.824	281.772
2. advertising	9.833	12.649	28.183	34.662	22.987	44.766	58.681	98.578
(selling subtotal)	(9.833)	(12.649)	(28.183)	(158.608	(22.987)	(180.912)	(137.705)	(380.350
Administration:								
3. salaries, benefits	258.722	988.298	172.250	384.716	199.320	135.088	233.777	156.672
4. travel		10.807		8.662		17.873	27.409	44.111
5. insurance	9.778	12.964	9.150	7.689	11.107	12.893		27.422
6. telephone, telegraph		32.701		14.676		10.560		17.944
7. office and shop	6.556	77.719	136.650	77.854	166.960	64.220	74.855	168.894
8. legal and audit	9.167	21.491	25.683	11.378	30.000	8.400	121.314	27.106
9. data processing	29.167	33.017	146.450	13.000	141.600			29.744
10. freight, vehicles		140.491	93.150	118.743	82.280	55.286	113.057	48.067
11. other	94.389	97.493	26.033	56.324	45.000	3.020	58.050	134.833
(admin. subtotal)	(407.779)	(1414.961)	(609.366)	(693.042)	(676.267)	(307.340)	(628.462)	(654.793)
Technical Costs:								
12. maintenance	259.333	763.982	228.500	134.986	362.627	224.580	497.327	448.583
13. power	76.222	65.508	31.400	22.378	20.360	23.886	see #7	9.928
14. pole rental, system leasing	1300.722	205.807	145.950	66.108	132.227	89.553	155.151	113.240
(tech. subtotal)	(1636.277)	(1035.297)	(405.850)	(223.472)	(515.214)	(338.019)	(652.478)	(571.751)
Other:	0.506	32.052	23.833	6.070	33.280	11.607	161.304	68.522
TOTAL	2053.333	2494.959	1067.232	1081.192	1247.748	837.878	1579.949	1675.416
Average Technical Costs (items 12, 13, 14) As % of Operating Costs	80%	42%	38%	21%	41%	40%	41%	34%

continued

Table II-14--continued

System	H	G	I	J	S	K	L	M-1968
(Miles of Plant)	(200)	(256)	(380)	(472)	(496)	(700)	(700)	(1000)
OPERATING COSTS PER MILE (¢)								
Selling Costs:								
1. sales commissions	85.875	129.191	79.268	84.169	see #3	404.280	121.229	416.875
2. advertising	111.100	59.898	31.505	72.068	45.542	92.627	75.946	69.317
(selling subtotal)	(196.975)	(189.089)	(110.773)	(156.237)	(45.542)	(496.907)	(197.175	(486.192)
Administration:								
3. salaries, benefits	347.650	368.782	318.229	242.362	552.762	301.126	171.538	188.910
4. travel		24.141	21.245			27.717	14.557	12.310
5. insurance	8.410	2.648	7.713	4.919	4.098	12.894	1.726	23.447
6. telephone, telegraph			18.097			24.199		23.805
7. office and shop	336.885	128.738	73.407	157.794	110.403	59.967	47.731	175.862
8. legal and audit	16.855	102.578	19.811	12.712	8.735	28.327	16.611	34.251
9. data processing		52.457	14.313		130.085	135.089	86.427	40.947
10. freight, vehicles	93.705	84.289	51.105	115.250	80.057	82.554	46.224	63.030
11. other	247.915	65.539	74.061	65.790	52.972	96.348	54.181	93.037
(admin. subtotal)	(1051.420	(829.172)	(597.981)	(598.827)	(939.113)	(768.221)	(438.995)	(655.599)
Technical Costs:								
12. maintenance	751.945	375.621	345.844	418.731	421.194	749.064	294.726	310.171
13. power	18.715	10.941	31.868	26.337	15.968	39.106	25.726	22.924
14. pole rental, system leasing	157.845	208.656	178.445	138.134	529.419	202.861	256.297	215.432
(tech. subtotal)	(928.505)	(595.218)	(556.088)	(583.202)	(966.581)	(991.031)	(576.749)	(548.527)
Other:	30.000	135.680	64.191	0		60.049	130.252	147.426
TOTAL	2206.900	1749.159	1329.033	1338.266	1951.236	2316.208	1343.171	1837.744
Average Technical Costs (items 12, 13, 14) As % of Operating Costs	42%	34%	42%	44%	50%	43%	43%	30%

Source: confidential

Before integrating these results with the previously derived data on fixed investment per mile, it will be necessary to briefly discuss depreciation rates and policies.

Due to the time value of money, it is advantageous for business firms to postpone payments of corporate income tax as far into the future as possible. By using accelerated depreciation rates, which need bear little or no relation to actual (estimated) capital life, firms are able to incur large paper losses in early years; these losses may then be applied to earnings in future years to once more reduce taxable income.

In Table II-15 is presented permissible depreciation rates for tax purposes, for various asset categories, and for comparison the estimated actual depreciation rates for these assets, based on the useful life of the asset. The latter figures were estimated by a CATV accounting specialist. Actual CATV practice is generally to depreciate assets at rates somewhere between those maximum rates permitted for tax purposes and the rate that would correspond to the useful life of the equipment.

The problem involved in using actual depreciation allowances used in the CATV financial statements is that it is impossible to separate out the influence of the revenue side. In attempting to find an optimal size of CATV plant from a cost efficiency point of view, it is desirable to abstract from the revenue side of the balance sheets. We are more

Table II-15. Permissible and Estimated Actual Depreciation Rates for CATV Assets

Asset Classification	Permissible Rates for Tax Purposes	Estimated Actual Depreciation Rate
1. Land	-	-
2. Land Improvements	4.0 D.B[1]	5.0 S.L.[1]
3. Head-end Bldg.	10.0 DB	5.0 S.L.
Studio and Office Bldg.	5.0 DB	5.0 S.L.
4. Tower and Antenna System	25.0 DB	7.5 S.L.
5. Studio equipment and other Technical Equip.	25.0 DB	12.5 S.L.
6. Mobile Equipment	25.0 DB	12.5 S.L.
7. Automobiles and Trucks	30.0 D.B.	20.0 S.L.
8. Furniture and Fixtures	20.0 D.B.	10.0 S.L.
9. Plant and Equipment	20.0 D.B.	At least 10.0 S.L.
10. Leasehold Improvements	Life of lease, S.L. (10 yrs)	Life of lease, S.L. (10 yrs)
11. Bell Rights	Life of agreement S.L. (10 yrs.)	Life of agreement S.L. (10 yrs)
12. Drops	25.0 D.B.	12.5 S.L.

Source: Conversations with CATV accountant

[1]D.B. = declining balance
S.L. = straight line

concerned with the technologically determined minimum efficient scales of plant than the most profitable size of system, the latter depending on many exogenous factors.[28] In the previous analysis, this problem was dealt with by abstracting from drop costs. Similarly, it will now be necessary to use a dummy depreciation rate for the same reasons.

A second difficulty that would arise from using the actual depreciation rates employed by the individual firms is that this practice would invariably bias the results in favour of the older firms. With a declining balance method of depreciation accounting being used, older firms which had already exhausted a good deal of their depreciation reserve would appear to be low cost firms because of the lessened depreciation charges. Even if the actual, real-world, depreciation rates are felt to be declining balance, this method cannot be used for our purposes because of this age of system factor. The problem would not take on the same importance in established industries, but for a comparatively new industry like CATV, where some of the firms are very new, where many of the older firms have recently expanded their equipment into new areas, it would bias the results to a very great extent to use depreciation figures from the books of the cable companies.

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[28] These include not only government depreciation schedules, but those host of factors that will affect not only the saturation of the system at a point in time (see page 41), but also the actual (or estimated) rate at which new subscribers join the system through time.

By examining Table II-6, which gives a break-down of fixed assets (on a per mile of plant basis) for five CATV companies, it is possible to determine the relative importance of the various asset categories listed in Table II-15, and this is shown in Table II-16.

By multiplying the relative importance of each asset category by the estimated depreciation rate and summing all such calculations for each system, a theoretical over-all depreciation rate is derived for each system. Such over-all rates for the five systems range from 9.6% to 10.1% with a mean of 9.8%. Therefore, in the analysis that follows, it is assumed that a 10% rate of depreciation for the fixed assets for entire CATV systems is a reasonable figure. A 10% rate of depreciation for a cable television system will probably be somewhat on the low side, due to the rates of technical advance and obsolescence. However, given the strong diseconomies resulting from large systems, as developed in Table II-5, by using the lower bound of depreciation rates, any conclusions regarding diseconomies of large scale will be much stronger, since the faster the fixed assets must be written off, the more important will become the fact that large systems tend to invest more heavily per mile of system length.

To the average operating costs per mile of plant shown in Table II-13, the estimated "true" depreciation costs are added, as found by taking 10% of the total fixed assets

Table II-16. Calculation of an Over-all Depreciation Rate for the Assets of Five CATV Systems

Asset Category (Est. Deprec. Rate)	Percentage of Asset Category to Total Assets for Five Companies					Percent of Asset Category to Total Assets Times Est. Depre. Rate				
	F	F	G	H	J	E	F	G	H	J
1. Land (0%)	2%	1/2%		4%		0	0	0	0	0
2. Bldgs; land improv. (5%)	0%	1%		1/2%	0%	0	0	0	0	0
3. Antennae, tower (7.5%)	2-1/2%	19%	6-1-2%	leased	leased	0.2%	1.4%	0.5%	-	-
4. Technical equip. (12.5%)	1%	7%	3%	6-1/2%	4%	0.1%	0.9%	0.4%	0.8%	0.5%
5. Vehicles (12.5%)	2-1/2%	1%	3%	leased	1%	0.3%	0.1%	0.4%	-	0.1%
6. Plant and equipment, furniture (10%)	91%	71-1/2%	88%	88%	95%	9.1%	7.2%	8.8%	8.8%	9.5%
TOTAL	99%	100%	100.5%	99%	100%	9.7%	9.6%	10.1%	9.6%	10.1%

Source: Table II-6 and Table II-15.

(excluding capitalised drops) for those firms for which information on both operating costs per mile and fixed assets per mile have been obtained. These results, which are shown in the final column of Table II-17 give the average cost per mile of cable television systems of various sizes for one year of operation.

By graphing the results of Table II-17 in Figure II-9, one notices that the expected diseconomies of scale occur fairly early (at about 200 miles).

By studying the distribution of costs in Figure II-9, it is possible to distinguish three categories of firm sizes--(1) systems of 50 to 100 miles in length, which average around $1700 per mile in total costs, (2) systems of 150 to 400 miles in length, which average $2300 per mile in total costs, and (3) systems over 600 miles in length, which average $2900 in costs per mile. The single system of less than 50 miles plant was a relatively high cost firm. Without further samples of firms of 10-40 miles in length, it is impossible to assess the significance of this high cost firm. Were this firm excluded from the sample, the average cost curve in Figure II-9 would flatten out at small system lengths or gradually rise (see dotted line).

On the basis of the data presented, it is clear that whatever economies that may exist for cable television systems are exhausted early and large firms are relatively disadvantaged.

Table II-17. Total Costs per Mile per Year, Various CATV Systems

Company	Year	Miles of Plant	Operating Costs per Mile	Estimated Depreciation Charges	Total Costs per Mile (1 year)
A	1968	18	$2066.00	$500.37	$2566.37
A	1969	18	2053.33	500.37	2553.70
B	1968	55	1362.14	566.99	1929.13
B	1969	74	1081.89	510.26	1542.15
C	1969	75	1247.75	311.82	1559.57
E	1968	89	837.88	587.20	1425.08
F[1]	1968,1969	180	1675.42	657.84	2333.26
G	1968	185	1709.21	628.83	2338.04
H	1969	200	2206.90	601.64	2808.54
G	1969	256	1794.16	534.57	2283.73
I	1968	327	1616.88	851.10	2467.98
I	1969	380	1329.03	773.76	2102.77
J	1969	472	1338.27	394.07	1732.34
K	1969	700	2316.21	932.90	3249.11
L	1969	700	1343.17	795.57	2138.74
M	1967	770	1983.38	1307.34	3290.72
M	1968	1000	1837.74	1073.69	2911.43

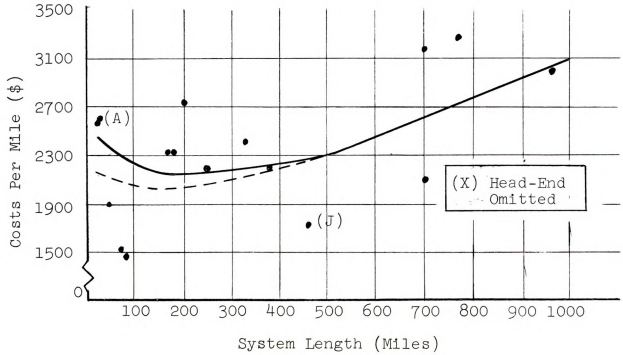
Source: Tables II-5 and II-18.

[1]1968 operating costs; 1969 depreciation. However miles of plant constant for these two years.

Figure II - 9

Average Total Costs Per Mile Of CATV System Length (1967 - 1970).

Source: Table II-17



The second standard employed for measuring the size of a cable television system was number of potential subscribers. In Table II-18 average costs on this basis are presented for the sample of CATV firms.

Once more, in order to find meaningful relations between operating costs (excluding depreciation) and system size, as defined by the number of households passed by the cable, the CATV systems are grouped into categories with similar saturations (see the discussion of page 50 ff). Three overlapping categories are used: high saturation of 50 to 100% as in Figure II-10A, medium saturation of 30 to 60% as in Figure II-10B, and low saturation of 0-40% in Figure II-10C. All three curves slope downward as system size is increased from very small systems, strongly indicating that such small systems are relatively disadvantaged. It appears there are certain inflexible overhead costs that must be met regardless of the size of the system.

However all three curves flatten out for system sizes greater than 20,000-25,000 potential subscribers, and the high saturation and medium saturation curves tend to coincide at such system sizes. This indicates that total operating costs of CATV, with saturation of at least 30% and with at least 20,000 potential subscribers, are simply a constant (about $9-$10) times the number of potential subscribers.

The low saturation curve in Figure II-10C continues a slight downward trend for systems larger than 20,000

Table II-18. Operating Costs per Potential Subscriber for Various CATV Systems

Company	Year	Number of Potential Subscribers	Operating Costs per Potential Subscriber	Percentage Saturation
A	1968	985	37.889	81
A	1969	992	37.095	88
R	1968	5000	12.886	75
R	1969	5000	12.807	61
N	1969	5075	15.007	58
P	1968	5333	26.667	85
P	1969	5340	26.632	87
B	1968	5980	12.528	40
B	1969	6178	12.962	54
C	1968	6500	12.724	67
C	1969	7000	13.369	71
D	1970	12,500	9.600	73
E	1968	14,400	8.728	37
O	1968	16,900	9.337	44
O	1969	16,900	10.311	50
T	1968	30,983	6.767	33
T	1969	32,650	7.694	47
I	1968	34,979	15.115	48
I	1969	37,197	13.577	55
G	1968	43,407	7.285	34
G	1969	45,725	9.793	54
F	1968	42,500	7.096	18
S	1968	51,476	12.979	21
J	1968	60,904	8.570	51
J	1969	62,700	10.074	58
S	1969	107,905	8.969	27
L	1969	171,000	5.498	21
K	1969	177,000	9.160	67
M	1967	380,000	4.019	9
M	1968	396,000	4.641	12

Source: confidential

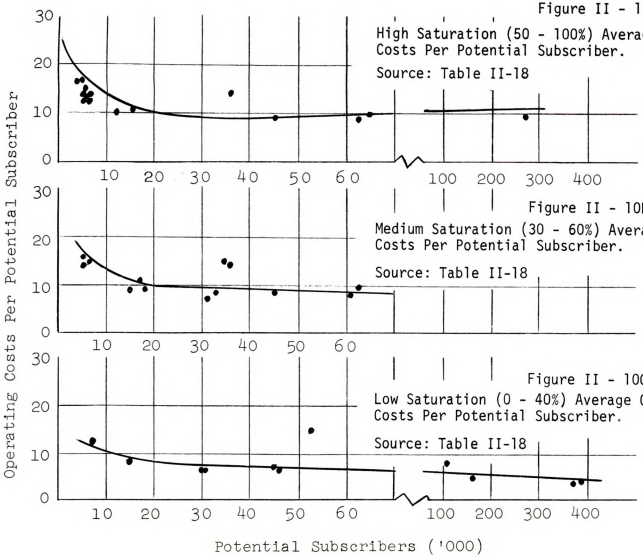


Figure II - 10A

High Saturation (50 - 100%) Average Operating Costs Per Potential Subscriber.

Source: Table II-18

Figure II - 10B

Medium Saturation (30 - 60%) Average Operating Costs Per Potential Subscriber.

Source: Table II-18

Figure II - 10C

Low Saturation (0 - 40%) Average Operating Costs Per Potential Subscriber.

Source: Table II-18

potential subscribers, and reaches lower levels of cost per potential subscriber than the medium and high saturation curves (for very large systems, about $7 compared to $9).

This discussion next investigates operating costs per actual subscriber and total costs per subscriber. Table II-19 shows the average operating costs for one year for a sample of CATV systems, together with the number of subscribers and the percentage saturation. Table II-19 does not take into account depreciation charges. Figure II-11 shows the relationship between percentage saturation and costs per subscriber.

Unfortunately, the number of companies whose detailed fixed investments were made available are considerably smaller than the number for which detailed operating expenses were attainable, especially at low saturations. Table II-20 presents a detailed break-down of operating costs for those companies for whom both fixed investments and detailed operating expenses are known. In calculating depreciation charges in this Table, two rates are used. Once more a depreciation rate of 10% is chosen for all assets excluding house drops. Since investment in drop material and labour forms such a large proportion of fixed assets, it would clearly bias the results were 10% used to depreciate these subscriber connections. Instead the rate of 20% is used for these assets, which corresponds well with industry practice of depreciating them at 20 to 25% per annum.

Table II-19. Average Operating Expenses (Excluding Drop Costs) For a Sample of CATV Systems, Various Years, Costs Measured per Subscriber

Company	Year	Number of Subscribers	Percentage Penetration	Operating Costs per Subscriber
A	1968	801	81	46.593
A	1969	871	88	42.248
B	1968	2383	40	31.438
N	1969	2920	58	26.082
R	1968	3056	61	21.083
B	1969	3355	54	23.869
R	1969	3721	75	17.209
C	1968	4359	67	18.974
P	1968	4498	85	31.617
P	1969	4660	87	30.518
C	1969	4980	71	18.792
S	1967	5146	28	62.409
F	1967	5200	11	46.142
E	1968	5300	37	23.714
O	1968	7400	44	21.324
F	1968	8000	19	37.698
O	1969	8400	50	20.745
D	1970	9250	73	12.973
S	1968	10,871	21	61.458
T	1968	12,154	33	17.250
G	1968	14,389	34	21.977
T	1969	14,600	47	17.206
H	1968	16,810	67	25.804
H	1969	17,013	68	25.944
I	1968	17,049	48	31.011
I	1969	20,476	55	24.664
G	1969	24,812	54	18.047
S	1969	29,529	27	32.775
J	1968	30,604	51	17.055
M	1967	35,784	10	42.679
J	1969	36,500	58	17.305
L	1969	41,870	21	22.454
M	1968	49,404	12	37.200
K	1969	118,700	67	13.659

Source: confidential

Figure II - 11

Average Cost Per Subscriber Of Operating CATV Systems For One Year (Excluding Depreciation Charges) As a Function Of The Percent Of Subscribers To Homes Passed By The Cable (Various Years).

Source: Table II-19

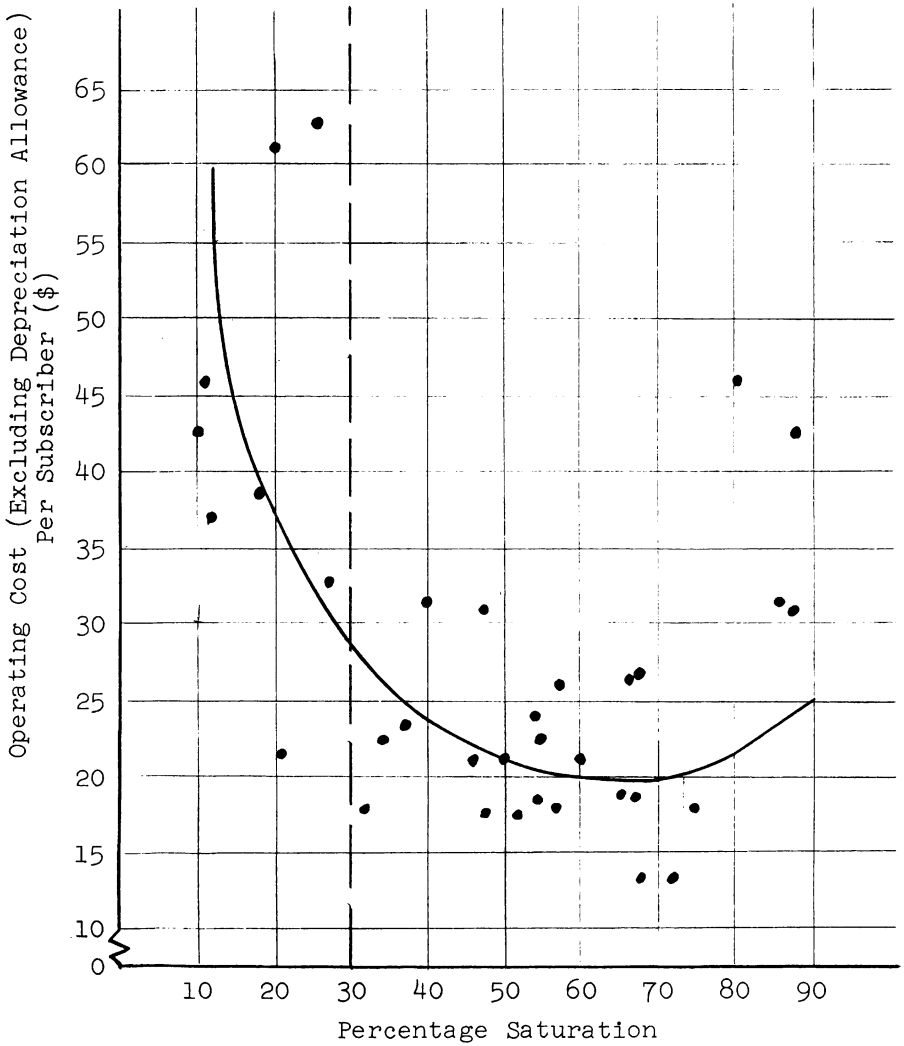


Figure II-11 indicates that an inverse relationship exists between average operating costs (per subscriber) and percentage saturation of the system. The Figure shows that variable costs--those over which the cable operator has a good deal of short run control--are quite unimportant. Figure II-11 bears a close resemblance to the average fixed costs curve of economic theory.

It will be noted, as has been the case throughout the investigations in this chapter, that cable firm A, with a very high saturation, is quite atypical. This firm, it will be recalled, was the smallest in the sample and consisted of only 18 miles of plant and under 900 subscribers. By removing this firm from the sample, due to its very small size and uneconomic cost patterns, it can be firmly stated that in order to obtain minimum operating costs per subscriber, cable systems of 50 miles of plant and over must generally obtain a saturation of over 30%. Thirty percent seems to be a good dividing line between low and high cost firms, although average costs appear to gradually decline beyond this saturation also. When firms are much smaller than 40 miles of cable, it would appear from the limited sample (one firm for two years) that they will be high cost firms, running costs per subscriber, even at maximum saturations, in the same order of magnitude as larger firms with only 10 to 15% saturation.

Next, Table II-20 is closely examined. This table presents a complete cost break-down of operating costs and includes depreciation charges.

Selling costs are large, both in relative and absolute terms, for those firms with saturations under 30%, and account for about 25% of total operating costs, and amount to $8.00 to $12.00 per subscriber. For medium to high saturation firms, selling costs per subscriber drop off sharply to about $2 to $3. In general, the relative importance of these costs also fall, generally accounting for 1/8 to 1/10 of total operating costs.

Selling and administrative costs together account for much of the downward slope in the average costs vs. percentage penetration curve, the other components of average cost (technical and depreciation) being fairly constant per subscriber. Of the administration costs, the largest component--salaries and benefits--is also quite constant, running generally between $3.50 and $4.50 per subscriber. This is what one would expect, since salaries form a highly divisible cost, whereas the other components of administration charges are more of a lump sum nature.

There is no ready explanation for the apparent over-all constancy of technical costs. They do appear to decline slightly per subscriber as saturation increases, and they show a much higher variance than either selling or administrative costs; this no doubt reflects the variation in two

Table II-20. Detailed Break-down of Annual Costs per Subscriber for CATV Systems (1967-1970)

System--Year (No. Subscribers) [% Saturation]	M-1967 (35,784) [10]	F-1967 (5200) [11]	M-1968 (49,404) [12]	F-1968 (8000) [19]	L-1969 (41,870) [21]	G-1968 (14,389) [34]	E-1969 (5300) [37]
OPERATING COSTS PER SUBSCRIBER ($)							
Selling Costs:							
1. sales commissions	8.111	8.343	8.438	6.340	2.027	2.312	2.853
2. advertising	2.532	4.008	1.403	1.924	1.270	0.398	1.267
(Total selling)	(10.643)	(12.351)	(9.841)	(8.264)	(3.297)	(2.710)	(5.120)
Administration:							
3. salaries, benefits	4.278	6.975	3.824	5.400	2.868	6.285	3.823
4. travel	0.416	1.720	0.249	1.099	0.243	0.405	0.506
5. insurance	0.610	0.721	0.475	0.617	0.029	0.038	0.365
6. telephone, telegraph	0.634	0.591	0.482	0.404	see #7	see #7	0.299
7. office, shop	3.451	3.883	3.560	4.258	0.278	1.665	1.818
8. legal and audit	1.188	0.813	0.693	0.610	0.278	0.701	0.238
9. data processing	0.952		0.829	0.669	1.445	-	
10. freight, vehicles	1.240	1.676	1.276	1.082	0.773	1.206	1.565
11. other	3.234	0.450	1.883	1.182	1.906	1.473	0.085
(Total admin.)	(16.010)	(16.834)	(13.271)	(15.322)	(7.340)	(11.818)	(8.699)
Technical Costs:							
12. maintenance	8.115	11.929	6.278	9.668	4.927	4.139	6.356
13. power	0.632	0.310	0.464	0.223	0.430	0.082	0.676
14. pole rental, system leasing	6.224	4.043	4.361	2.973	4.285	2.224	2.535
(Total technical)	(14.971)	(16.282)	(11.103)	(12.864)	(9.642)	(6.445)	(9.507)
Other	1.106	0.465	2.984	1.331	2.178	0.602	0.329
TOTAL	42.730	45.932	37.199	37.781	22.457	21.575	23.715
Depreciation							
1. 10% deprec. rate	28.131	19.165	21.733	14.801	13.301	8.085	11.709
2. 20% rate for drops	4.400	4.400	4.400	4.400	4.400	4.400	4.400
Total Depreciation	32.531	23.565	26.133	19.201	17.701	12.485	16.101
Total Costs Per Subs.	75.261	69.497	63.332	56.982	40.158	34.060	39.816

Table II-20--continued

System--Year (No. Subscribers) [% Saturation]	B-1968 (2383) [40]	I-1968 (17,049) [48]	O-1969 (8400) [50]	G-1969 (24,812) [54]	B-1969 (3355) [54]	I-1969 (20,476) [55]	J-1969 (36,500) [58]
OPERATING COSTS PER SUBSCRIBER ($)							
Selling Costs:							
1. sales commissions	0.924	2.309	1.292	1.333	2.734	1.471	1.088
2. advertising	0.341	0.136	0.924	0.618	0.765	0.585	0.932
(Total selling)	(1.265)	(2.445)	(3.508)	(1.951)	(3.499)	(2.056)	(2.020)
Administration:							
3. salaries	10.452	6.754	2.720	3.805	8.486	5.906	3.134
4. travel	0.259	0.606	0.155	0.249	0.191	0.394	
5. insurance	0.066	0.024	0.716	0.027	0.170	0.143	0.064
6. telephone, telegraph	0.569	0.372	see #7	see #7	0.324	0.336	
7. office, shop	1.854	2.607	2.359	1.328	1.717	1.362	2.041
8. legal and audit	0.629	0.621	0.281	1.058	0.251	0.368	0.164
9. data processing	0.336	0.352		0.541	0.287	0.266	
10. freight, vehicles	1.850	1.357	0.606	0.870	2.619	0.948	1.490
11. other	0.839	1.211	1.367	0.676	1.242	1.374	0.851
(Total admin.)	(16.854)	(13.904)	(8.204)	(8.554)	(15.287)	(11.097)	(7.744)
Technical Costs:							
12. maintenance	10.624	10.741	3.992	3.876	2.977	6.418	5.415
13. power	0.530	0.764	0.487	0.113	0.494	0.591	0.341
14. pole rental, system leasing	2.092	2.956	1.842	2.153	1.458	3.312	1.786
(Total technical)	(13.246)	(14.461)	(6.321)	(6.142)	(4.929)	(10.321)	(7.542)
Other	0.339	0.104	1.920	1.400	0.134	1.191	0
TOTAL	31.704	30.914	19.953	18.047	23.849	24.665	17.306
Depreciation							
1. 10% deprec. rate	13.086	16.324	15.078	5.515	11.255	14.360	5.096
2. 20% rate for drops	4.400	4.400	4.400	4.400	4.400	4.400	4.400
Total Depreciation	17.486	20.724	19.478	9.915	15.655	18.760	9.496
Total Costs Per Subs.	49.190	51.638	39.431	27.962	39.504	43.425	26.802

Table II-20--continued

System--Year (No. Subscribers) [% Saturation]	N-1969 (2920) [58]	C-1968 (4354) [67]	K-1969 (118,700) [67]	A-1968 (801) [81]	A-1969 (871) [88]
OPERATING COSTS PER SUBSCRIBER ($)					
Selling Costs:					
1. sales commissions	1.045	see #3	2.384	see #3	see #3
2. advertising	1.200	1.031	0.546	0.750	0.203
(Total selling)	(2.245)	(1.031)	(2.930)	(0.750)	(0.203)
Administration:					
3. salaries, benefits	7.378	5.054	1.776	12.539	5.347
4. travel	0.171		0.163		
5. insurance		0.178	0.076	0.120	0.202
6. telephone, telegraph			0.143	0.390	
7. office, shop	3.747	1.921	0.354	1.088	1.278
8. legal and audit	0.539	0.161	0.167	0.449	0.189
9. data processing			0.797	0.749	0.603
10. freight, vehicles		1.251	0.568		
11. other	0.412	0.534	1.406	0.950	0.808
(Total admin.)	(12.247)	(9.099)	(4.531)	(16.285)	(8.427)
Technical Costs:					
12. maintenance	7.989	5.916	4.417	5.908	5.348
13. power	0.536	0.437	0.231	1.532	1.575
14. pole rental, system leasing	2.860	2.135	1.196	23.291	26.881
(Total technical)	(11.385)	(8.488)	(5.844)	(30.728)	(33.804)
Other:--bad debt	0.205	0.378	0.354	0.393	0
TOTAL	26.082	18.996	13.659	54.906	42.434
Depreciation					
1. 10% deprec. rate	19.980	7.899	5.502	11.244	10.341
2. 20% rate for drops	4.400	4.400	4.400	4.400	4.400
Total Depreciation	24.380	12.299	9.902	15.644	14.741
Total Costs per Subs.	50.462	31.295	23.561	70.550	57.175

Source: confidential

factors--lengths of the systems and special conditions peculiar to the municipalities in which the systems are located, such as weather conditions.

Depreciation charges are fairly constant over-all except at saturations of less than 20%, where the amounts invested per subscriber are substantially greater than at higher saturations. The reason for this is quite clear. At low saturations, the capitalised drop charges are relatively less important, and the other capital costs must be spread over fewer subscribers. As saturation increases, these house connections become relatively more important, and they tend to be fairly constant per unit from system to system, and the fact that they are depreciated at twice the rate of the other assets (20% vs. 10%) will increase the rate at which their importance grows. The behaviour of these component costs of CATV systems is pictured in Figure II-12.

In discussing the over-all costs per subscriber for CATV systems of different saturations, it is again convenient to think of three classes of CATV systems, rather than use the smooth downward sloping curve of Figure II-12.

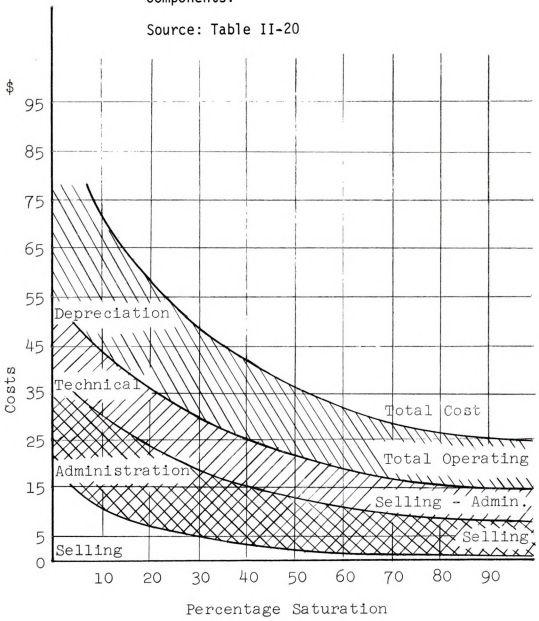
The low saturation firms, those with 30% or less of the available households wired for cable, are very much disadvantaged, and their over-all yearly costs will run between $75 and $40, the firms with the lowest saturations in this category approaching the upper boundary.

Firms with over 30% but less than 50% penetration face costs ranging around the lower bound of the low saturation

Figure II - 12

Total Yearly Cost (Excluding Only Interest Payments) Per Subscriber For CATV Systems With Various Saturations; Costs Broken Into Components.

Source: Table II-20



firms ($35 to $50). Firms with high saturations are the low cost firms on a per actual subscriber basis, with costs ranging from $25 to $45 per subscriber.

The results are now summarised below, before discussing the implications:

(1) Fixed investment per mile of CATV plant increases (although probably at a decreasing rate) as the size of the cable system grows (see Figure II-1). Firms with less than 250 miles of distribution cable tend on average to have $4000 to $6000 invested per mile (exclusive of capitalised drops), while firms with over 300 miles tend to have $7500 to $10,000 invested per mile of plant.

(2) Fixed investment per household passed by the cable falls off sharply as systems grow from very small sizes to system sizes of about 30,000 potential subscribers, and thereafter investment for each such potential subscriber (exclusive of drop charges) is quite constant for all system sizes, amounting to $25 to $30.

(3) Fixed investment per potential subscriber drops off sharply as population density rises and tends to approach a constant level of $25 when the number of households per mile of cable reaches 150. While firms with more than 150 households passed per mile of cable are not relatively advantaged when compared to those with 150 per mile, firms with less than this figure tend to rapidly become disadvantaged and at 80 households per mile fixed investment per potential subscriber will be $60 or more.

(4) In order to obtain the lowest possible investment per subscriber it appears necessary to obtain a saturation of over 50% of the households passed, in which case such investment amounts to $70 to $80, including drops. For systems with lower saturations, such investment per subscriber varies between $140 and $160.

(5) Operating costs for a CATV system, excluding depreciation, tend to fall as the system grows, when measured on an average per mile basis, but only up to plant sizes of about 200 miles; when attention is paid to plants longer than 150 to 200 miles, one finds substantial diseconomies, with operating costs ranging from $1800 to $2000 per mile for systems over 700 miles compared to $1200 to $1400 for systems between 150 and 200 miles.

(6) By admitting depreciation allowances into operating costs, and at the same time ignoring uneconomically small plants of under 40 miles of cable, one finds that costs per mile rise continuously as successively larger CATV systems are studied. Yearly expenses average $1450 to $1800 per mile for small systems of 50 to 100 miles of cable, and $2500 to $3200 for systems over 600 miles. Systems falling within these system sizes tend to face costs between these extremes. Systems under 40 miles of plant appear to be very high cost firms.

(7) CATV systems face constant costs per potential subscriber for systems over 25,000 to 30,000 potential subscribers. The situation does not change when depreciation

allowances are added to operating costs. However, one may question the suitability of using number of potential subscribers as a measure of the size of the system.

(8) Operating costs per subscriber reach a minimum of $18 to $27 when the CATV system has attracted a minimum of 30% of the households passed to the system. For systems with less than this minimum saturation, operating costs per subscriber rise rapidly, generally being at a level of $40 when saturation declines to 10 to 15%. Although there is much variation among firms with similar saturations, it appears that when depreciation charges are included in operating costs, a minimum of 55% saturation is necessary for low costs per subscriber and evidence exists that for higher saturations these costs will continue to decline. Again, for systems under 40 miles it appears they will face high subscriber costs regardless of their saturation.

It is doubtless apparent to the reader that several pieces of conflicting analysis have been produced. Before discussing the policy implications of the cost analysis, I shall briefly attempt to reconcile some of these conflicts.

When fixed investment costs, operating costs and also when total annual costs (operating costs plus depreciation) were studied for CATV systems of varying lengths, it was found that CATV was an increasing cost industry; however when these same costs were studied for CATV systems of different capacities (i.e. potential subscribers), the industry was

determined to be a decreasing cost industry up to probably 30,000 potential subscribers and then a constant cost industry thereafter.

These conclusions immediately raise two questions: (i) why does the conflict exist, and (ii) which is the more meaningful measure?

The first point to be made is that were the number of potential subscribers per mile constant for all systems, the results could not diverge, and in effect we would have only one measure of system size--and costs would rise as we move to larger systems. Therefore, in the sample, as systems become larger (as defined by number of miles), population density must also grow.

In fact, by studying Figure II-9, the extra cost per mile of cable is about $2.00 (for systems above 300 miles) and in order to maintain constant costs per potential subscriber for systems over 300 miles, the density of households must rise by 0.174 households per mile. These calculations are shown in Table II-21. Constant costs per potential subscriber employed are $11.50, composed of $9.00 in operating costs and $2.50 in depreciation charges (i.e. 10% of $25 in fixed assets per potential subscriber). This marginal increase of .174 households per mile is simply a mathematical necessity given the data and should not be considered as any sort of causal determinant with regard to the existence or absence of economies of scale.

Table II-21. Calculation of Necessary Increase in Households per Mile to Allow Increase in CATV Costs per Mile of $2.00, Yet Maintain Constant Costs per Potential Subscriber of $11.50

Miles	Cost per Mile	Marginal Rise in Cost/Mile	Cost per Potential Subscriber	Number Potential Subs/Mile	Marginal Rise in Potential Subscribers/ Mile
300	$1900		$11.50	165.2	
400	2100	$2.00	11.50	182.6	.174
800	2900	2.00	11.50	252.2	.174
1000	3300	2.00	11.50	287.0	.174

Having discovered the cause of the apparently conflicting results one may pose two diametrically opposed hypotheses (which may properly be considered limiting cases) and discuss their likelihood and implications.

For the first hypothesis, one can state that costs per potential subscriber is the important variable, and that in planning and operating a cable television system, cable owners have a wide option of equipment and a good deal of flexibility in the amount of maintenance they choose in order to keep the system operating well. However, in this hypothesis these operators are not willing to expend beyond a certain cost per potential subscriber-revenue per potential subscriber ratio. Rates charged subscribers are quite uniform throughout Canada, averaging $60 a year. Therefore the costs these operators are willing to incur will be generally uniform (per potential subscriber) also.

The fact that the number of households per mile of plant tends to grow (at a rate of .174 households per mile) as larger systems are studied gives the false impression of diseconomies of scale. In fact, the marginal cost of serving an additional subscriber is almost zero (excluding drop costs) and the existence of increased population density in larger systems simply allows the operator to invest more heavily for all subscribers by using more expensive amplifiers and cable and keeping the system in better repair while still maintaining his desired cost-revenue ratio per potential subscriber. The behavioural concept employed in this assumption would be the converse to a pricing principle sometimes employed in oligopoly theory wherein costs of production tend to be more or less given and the oligopolist adds on a "profit" margin in order to obtain a target rate of return. The assumption here is that price is given (since it is more or less regulated by the CRTC in the sense that Commission approval is required before rates may be changed) and so CATV operators are forced into varying costs in order to ensure the target rate of return.

This hypothesis implies that smaller systems, due to a lower population density, are comparatively disadvantaged, because the operator is not willing to employ the best equipment available. At the very least it may be stated these small systems are no better off than the large ones, since small systems do not require such excellent equipment due to

technological factors studied previously. However, large systems are not comparatively disadvantaged, as one would believe a priori since their greater revenue potential per mile allows their owners to go to greater expense per mile, thereby tending to neutralise any inherent technical disadvantage. If this hypothesis were accepted, one might reasonably conclude that public policy should favour large cable systems buying out small ones, so that a cross-subsidisation in investment might take place.

The reasonableness of this hypothesis, however, depends upon the key assumption that the desired price-cost ratio is on a potential subscriber basis, where potential subscriber is defined as households passed by the cable. The reasonableness of this assumption may be challenged, however.

If one studies Table II-11 it will be noticed that the largest systems (those with the highest population density) are generally the low saturation firms. Large firms would appear to have a lower expected saturation than small firms.

There is a good reason for this. Most of the larger Canadian population centres are strung along the Canadian-United States border, and such centres are generally in a more favourable position to pick up United States television channels without the help of CATV: this in turn will, of course, tend to reduce the percentage of households subscribing to cable when compared to centres in which United States channels are difficult to receive without cable.

Countering this effect somewhat, however, are reception difficulties in very large municipalities due to the preponderance of high rise buildings and the desire for "ghost-free" reception with the advent of colour television. The importance of this concept may be expected to grow with time. Another factor that influences the expected ultimate saturation of cable systems in large municipalities is the relations between the cable operators and apartment owners.

By way of illustrating this last point, one can point to the friction existing between the high-rise apartment owners and cable television companies in Toronto. A recent CRTC public hearing (Dec. 16, 1971) dealt with an application by G. R. Conway's Cable Utility Communications Company to establish a cable grid in Toronto to serve apartment buildings only. The company would charge only $C.75 per month per apartment suite and would service an estimated 70,000 suites; the company also had grand plans for cablecasting on the system. Were Cable Utility granted a licence, however, the existing cable television companies in Toronto would have been shut out completely from the potentially lucrative apartment market.

The friction mentioned earlier came to public attention when A. E. Diamond of Cadillac Property Management (which controls 14,000 apartment suites itself) told the CRTC at the hearing that unless the Conway application were granted before December 31, 1971, ninety percent of the apartments would

begin instaling their own master antenna (MATV) equipment, effectively removing Toronto apartments from CRTC regulations, since MATV is not under the control of the CRTC. Currently one apartment complex (Tel-Apart in St. James Town) is running movies every night on the closed circuit apartment cable network, without being subject to any regulation by the CRTC.

Diamond stated that his hostility to the older cable firms arose from their arrogance and attempts to exploit their monopoly position by charging (on average) $3.00 per suite. Conway's licence application was denied, but the CATV apartment conflict has not yet been resolved.[29] As suggested in Chapter III in more detail, the possibility of bypassing regulation in the erection of MATV systems points to the difficulty regulators face in maintaining control of an industry in the face of technological change.

Once it is admitted that number of households passed by cable is a poor measure of expected revenue (even in the fairly long run), the rationale for maintaining a constant cost per potential subscriber as herein defined for various system sizes would tend to disappear. Attention is now turned to the second hypothesis.

It is now postulated that costs per mile of cable is the relevant variable. Having established that costs per mile increase as attention is successively focused on larger

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[29]Toronto Star. November 23, 1971, p. 36 and December 17, 1971, p. 23.

and larger systems, it may be concluded that CATV suffers from diseconomies of scale. In addition to the empirical evidence, there are strong theoretical reasons for believing this to be true. Rising costs per mile are not a result of policy decisions made by cable companies, but are rather forced upon them by technological considerations.

The fact that costs per household passed by the cable are constant for different system sizes is explicable by the rising population density per mile for large systems. However, it is important to realise that were large cable companies split up into several companies (of 100 miles of plant each) the costs per mile for these systems would fall, and this would cause a corresponding decline in costs per household passed by the cable. In this way, the constancy of costs per household passed is really a meaningless statistic and is due simply to the fortuitous relationship between rising costs per mile and increased population density per mile.

And, it should be recalled that neither measure postulates economies of scale for firms over 30,000 potential subscribers (equivalent to about 180 miles of plant).

IV. Policy Implications

From the data and conclusions presented above, certain policy implications may be reached in three areas: (i) the desirability of maintaining fragmented ownership in large municipalities; (ii) the feasibility of promoting competition

through over-wiring; and (iii) an assessment of the likelihood that CATV will serve under-populated rural areas were public policy directed to replacing over-the-air broadcasting by cable.

(i) Fragmented ownership

Strong theoretical and weaker empirical evidence has been presented to indicate that smaller CATV systems tend to be more efficient than large systems, although a minimum system length of 40 to 50 miles appears to be necessary. In situations where several CATV operators in a municipality could pool their resources into the joint ownership of the highest quality head-end, any lingering disadvantages of such a policy of dividing up territories would tend to disappear.[30]

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[30]For cable systems far from the head-end sites microwave could be used (subject to Department of Communications authorisation) to send the signals to a local, less costly head-end. In the United States such Community Antenna Relay Systems (CARS) are being used not only in cities in place of trunk line cable for special situations, but also to relay distant signals to the system's head-end. For distances greater than 10 miles, they are said to be economically comparable to the trunk system, while avoiding such problems as rights-of-way, pole rights, construction, etc. Such a system would allow not only the sharing of a head-end among different systems within a municipality, but also among systems in neighbouring municipalities. A serious disadvantage is, of course, the necessity of using up spectrum (generally 12.7 to 12.95 GHz) which removes one of the inherent advantages of CATV's promise (i.e. distributing television signals without the use of spectrum). One advantage of CARS, however, may be that otherwise uneconomical areas may be served by cable t.v. Such a situation could arise when an area has sufficient population to warrant the large investment in laying the cable and electronics, but become uneconomical after account has been taken of the necessity of instaling an expensive head-end. Such a case may occur when there is proximity to a larger population area. See TV Communications, November 1969, pp. 78-87, and November, 1970, pp. 32-65.

There may be additional advantages to a policy of fragmented ownership in addition to the cost advantages of small systems. For example, the presence of more than one CATV system within a municipality will give the residents of that community a yardstick with which to compare performance. The greater the number of systems, the higher the level of service that should be achieved by some system, and hence, the greater will be pressures on other systems to match the standards achieved by the best system in the area.

Another factor, and to some a very real advantage, involves the fragmentation of economic power as a political question. There do not appear to exist any technological imperatives leading to concentrated ownership in the CATV industry, and so, from this viewpoint, cable television need not follow the example set by the telephone companies through the years with regard to the concentration of control in the industry.

In the view of some, regulation of Bell Canada under the aegis of the Canadian Transport Commission has been ineffectual at best, In contrast, the CRTC has been able to promulgate regulations in contradiction to the private interests of both broadcasters and CATV firms. Its ability to do so must be due, in part at least, to the absence of monolithic broadcasting or cable voices in opposition. The broadcasting industry itself lacks the great political power (for instance as held by the industry in the United States), since

it is divided into public and private sectors. The CATV industry has not yet attained the political power held by Bell Canada as it remains, thus far, an unconcentrated industry. In Canada, the major telephone companies have imposed severe anticompetitive restrictions upon the operations of cable television firms,[31] and it could be suggested that the CTC's inability (or at least lack of desire) to deal with the problem may be due to some extent, to the tremendous power yielded by these telephone companies.

If one accepts the proposition that great concentrations of private power, which are by definition more or less independent of most forms of social control (including market forces as well as political forces), may imperil both the effective functioning of democratic institutions and the efficient operation of the market economy, then with the spectre of CATV as a transmission line for data, computer outputs, books, and newspapers, it would be desirable to limit the power of such a telecommunications carrier before its power grows to such an extent that it become ungovernable.

(ii) Desirability of over-wiring

Over-wiring, i.e. allowing direct competition between two or more systems in an area, appears to be not feasible in CATV. Given the current practice whereby CATV systems

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[31] See Chapter III.

simply transmit broadcast television via cable, the consumer would have no incentive to join more than one CATV system.[32]

Even by abstracting from reality and assuming that in an area with two CATV systems of equal "quality," with each system having 40% of the houses passed by the cable as subscribers (80% over-all saturation), it seems unlikely that this situation would remain stable for a very long time. From Figure II-12 it is evident that the costs per subscriber faced by each firm will be about $45 (assuming 5000 subscribers to each firm, total yearly costs would amount to $450,000) whereas if a single firm were able to attract all the current CATV subscribers, his costs would fall to about $30 per subscriber ($300,000 total per year). By assuming a standard cable charge of $60 a year for each subscriber, substantial gains could be made by the firm with the largest resources behind it to shave prices in an effort to expand its saturation. Such price cutting would inevitably lead to the exit of one of the firms.

The possibility of two competing firms operating together in an area becomes more remote when it is remembered that in the most desirable cities a single monopoly firm now exists. The likelihood of any independent competitor trying to enter such a market is very low. He would face the

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[32]Were CATV systems able to sufficiently differentiate their product by large amounts of exclusive programming, there would exist some incentive for households to subscribe to more than one system, as households often subscribe to more than one newspaper. The importance of this concept remains in doubt, however.

task of winning away current subscribers from the other system, without provoking retaliation. The cheapest method of entry would appear to be outright purchase of the "competing" system.

There may be a time, however, when over-wiring in some areas may prove to be an attractive policy. This time will be, of course, when the capacity of the single coaxial cable has been exhausted and a new cable must be built to handle the "traffic". In such a case, government policy should properly divide up initially the services carried on the two cables in such a way as to ensure the survivability of both.

However, so long as a single cable has the capacity to handle a fairly large proportion of the services desired of it, over-wiring will remain impractical.

(iii) Rural areas

The question of the likelihood that cable will expand to rural areas is important when deciding whether over-the-air broadcasters should be protected, or allowed to "wither away" under the pressures of a new programme distribution system. The advantages of cable as a distribution system are numerous: it economises on spectrum useage; it allows "narrowcasting" or programming for specific, identifiable groups, rather than broadcasting or programming for the masses; it allows for a multiplicity of programme sources since the number of channels receivable in an area at one time are in principle limitless.

These advantages of cable over transmitter remain academic however so long as government policy to ensure the availability of television to all Canadians remains in force, if the likelihood of cable advancing to rural areas remains remote.

In Figure II-4, fixed investment per potential subscriber (households passed by cable) was plotted against the number of households per mile. It was found that for densities greater than 150 households per mile, such fixed investment tended to be low ($25 or so), but if the population density was around 100 households per mile, such investment was high ($50) and grew rapidly with further declines in density. At a density of 55 households per mile, average investment per potential subscriber was found to be over $90 (excluding drops), and the curve was rising rapidly. Operating costs for the firm in the low population density area were relatively very high also ($45 per potential subscriber).

Unfortunately, conjecture on the minimum density of households per mile that would be necessary to produce the arrival of a cable television system also requires estimates on the amounts the residents of these areas would be willing to pay for the service. If one may take $65 per year as the amount that would maximise revenues (which is roughly what urban households pay) and use $2000 as the average expenses incurred per mile by small cable systems, the break-even point for the cable firm will be thirty-one households per

mile of cable, and this is assuming a 100% subscription rate. If only 80% of the houses may be expected to hook into the system, the minimum density to just recover costs advances to 39 households per mile.

The conclusion seems to be, then that there is still a very valuable role to be played by the "scattergun" approach to signal distribution as exemplified by broadcasting stations.

This concludes the cable television cost analysis. Before proceeding to Chapter III, however, the reader is invited to turn to Appendices A and B which discuss the public utility characteristics of CATV and present some revenue data.

CHAPTER III

CATV AND THE COMMON CARRIER

I. Introduction

Over the past few years, the phrase "the wired city" has become commonplace in the vocabularies of many Canadians, and has often been used to denote a future utopian state in which communications technology has been mastered to such an extent that the availability of information of all sorts is instantaneous and practically limitless.

On one plane, as a Telecommission study points out, Canada is now a wired nation--and has been for several decades. Telephone and hydro-electric wires are available for every urban and most rural households. The phrases the "wired nation" and the "wired city" obviously mean more than this. The same Telecommission study states that "it is already customary to consider a 'Wired City' as a city with 'total telecommunications systems. Here 'total' is used to imply that the number of services that the system could provide is limited only by the imagination and pocketbook of the subscriber."[1]

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[1]Department of Communications. "Multiservice Cable Telecommunication Systems--The Wired City," Telecommission Study 8(d), (Ottawa: Information Canada), 1971, pp. 7-8.

Unlike many of the exciting technological breakthroughs of the past, the concept of the wired city, in the first instance, does not promise to free man's body from overwork, but rather to feed his mind; it, therefore, may be said to more closely resemble the invention of the printing press than of the wheel. In fact, the new communications technology is held to promise a new democratisation of information and entertainment.

A two-way system of broadcasting, implicit in the wired city concept, offering a multitude of programme choices, can take part in

> disestablishing broadcasting, freeing it from the domination of public agencies on the one hand and by business on the other, making it ... an agency of social change, of participatory democracy, available to ordinary citizens for the exchange of ideas, the governed to talk to their governors, public servants to account to the public they serve, consumers to confront producers. Until now, broadcasting has been largely a one-way channel of communication where the governors talk to the governed, the experts dispense their particular expertise and sellers brainwash buyers.[2]

Whereas the past forty years has experienced tremendous growth in the electronic mass media, technology is now permitting the development of "interactive media" such as CATV, video cassettes, information retrieval systems, and computer services. The former technologies have had a homogenising effect upon people and have tended to produce "mass man,"

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[2]Andrew Cowan. Communications and Northern Development, Submission by the Canadian Broadcasting Corporation to Telecommission Study 8(d). (Mimeo) August 1970, p. 9.

whereas the latter will have a liberating, humanising impact since they are adaptable to the needs and wishes of the individual.[3]

The information available immediately at home in the projected wired city is not of course limited to television programmes, but runs the gamut from fascimile printouts of newspapers to printouts of encyclopediae. Labour-saving services, such as alarm and meter reading, are available today through CATV in some centres in the United States. In-house computer terminals have been forecast.

Since and amount and type of information that may pass through the wires of the wired city is in principle limitless, concern over who controls the wires does not seem to be misplaced.

Presently there are two contenders for the control over broadband communications hardware--the telecommunication common carriers and the cable television industry. Section II of this chapter reviews both industries as to structure and technology and offers comparisons between the two industries and between each industry and the proposed wired city. Section III presents alternative plans for the wired city while Section IV documents the restrictions by which one of the participants (the common carriers) has blocked the

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[3]See Trans Canada Telephone System. "Integrated Intra-Urban Telecommunications," Telecommission Submission to Study No. 8(d), June 1970, p. 2. Also Department of Communications, "The Future of Communications Technology," Telecommission Study 4(a) (Ottawa: Information Canada), 1971, p. 82.

development of the other (the cable television companies). Section V summarises some policy issues.

II. Common Carriers and CATV as Forerunners of the Wired City

At the end of 1968, there were 1,772 telephone systems in Canada and they were comprised of the various types shown in Table III-1; these systems serviced 8,817,846 telephones.

Table III-1. Types of Telephone Systems in Canada, 1968

	Number of Systems	Number of Telephones
Federal systems	1	37,200
Provincial systems	10	1,136,303
Minicipal systems	30	282,537
Incorporated companies	109	7,276,968
Co-operatives	1,615	83,339
Partnerships	1	61
Sole proprietorships	6	1,438
Total	1,772	8,817,846

Source: Dept. of Communications. "History of Regulation and Current Regulatory Setting," Telecommission Study 1(b) (Ottawa: Information Canada), 1971, p. 3.

The major telephone companies have formed the Trans-Canada Telephone System (TCTS) to provide a nation-wide system of communications service. Each member provides the telephone plant within its territory for this national communications service, and revenues are shared according to the amount of

communications that enter and exit each territory. Smaller systems that are not members of TCTS generally deal directly with the TCTS member in the area. Members of TCTS are shown in Table III-2.

Table III-2. The Trans-Canada Telephone System, 1968

Members	Number of Telephones	Telephones As % of Total
Newfoundland Telephone Co., Ltd.	82,645	1
Maritime Telegraph & Telephone Co., Ltd.	256,388	3
New Brunswick Telephone Co., Ltd.	206,507	3
Bell Canada	5,450,782	68
Manitoba Telephone System	399,100	5
Saskatchewan Telecommunications	297,009	4
Alberta Government Telephones	432,612	5
British Columbia Telephone Co.	867,880	11
Canadian Overseas Telecommunications Corp.*	---	---
Total	7,992,923	100%

*Associate member

Source: Dept. of Communications, Study 1(b), op. cit, p. 4 and Dept. of Communications, "Corporate Ownership and Integration in the Telecommunications Industry," Telecommission Study 2(f) (Ottawa: Information Canada), 1971, p. 42.

Bell Canada, in addition to its operations in Ontario and Quebec, controls, or has interest in, six other major companies (Newfoundland Telephone, The Island Telephone, M T&T, New Brunswick Telephone, Northern Quebec and Northern Telephone) with the result that the Bell group controlled

69.4% of all telephones in Canada in 1968; Bell itself controlling 61.8% of the phones. East of Manitoba, the Bell group controlled 94.4% of telephones, Bell Canada itself accounting for 84.0% of these telephones.[4]

General Telephone and Electronics of the United States controls Okanagan Telephone Co., British Columbia Telephone Co., and Quebec Telephone Co., and the GTE group accounted for 11.7% of the total telephones in Canada (1968).[5]

The remaining 18.9% of telephones in Canada (i.e., the non-Bell and non-GTE phones) are accounted for in large measure by the provincially-owned telephone companies: Manitoba Telephone System (4.5%), Saskatchewan Telecommunications (3.4%) and Alberta Government Telephones (4.9%).[6]

Both of the largest systems are vertically integrated with a communications equipment manufacturer--Northern Electric is a wholly-owned subsidiary of Bell Canada and Northern itself controls several subsidiaries, while British Columbia Telephone Company, Automatic Electric (Canada) Ltd., Sylvannia Electric (Canada) Ltd. and Lenkurt Electric Company (Canada) Ltd., among others, fall under the common ownership of General Telephone and Electronics International Inc. (United States).[7]

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[4]Dept. of Communications, Study 2(f), op. cit., p. 43.

[5]Loc. cit.

[6]Loc. cit.

[7]Ibid., pp. 40-41.

The Canadian telephone industry employs 75,000 people, represents an investment of $6.5 billion, receives yearly revenues of over $1 billion. The telephone companies, in addition, own over 70% of all the coaxial cable used in CATV systems.[8]

By way of contrast, total revenues accruing to the CATV industry in 1968 were $31.3 million.[9] In contrast to the telephone industry, CATV is still an unconcentrated industry, although certain companies are taking control of a large number of systems. For example, Maclean Hunter Cable TV, Ltd. controlled cable systems in fourteen communities in 1970, and served 131,412 subscribers or about 15% of all cable households in Canada.[10]

The remaining major telecommunications common carrier in Canada is CN-CP Telecommunications, by far the largest of nine telegraph and cable companies in Canada. CN-CPT also controls Computer Sciences (Canada) Ltd.[11]

The large telephone and telegraph companies have diversified their services expanding into all facets of telecommunications, such as long distance carriage of television and radio programmes, TWX and Telex and broadband services.

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[8]Dept. of Communications, Study 8(d), op. cit., p. 45.

[9]Pitfield, Mackay, Ross & Co. Ltd. The Canadian Broadcasting Industry (Toronto), 1970, p. 9.

[10]Maclean-Hunter Cable TV Annual Report, Dec. 31, 1970.

[11]Dept. of Communications, Study 2(f), op. cit., p. 4.

In fact, 75% of CNT and CPT's revenues are derived from data transmission as opposed to simple telegraph service, and in the former area, they often compete vigourously with the telephone companies.[12]

The Canadian telecommunications industry is characterised by monopoly elements (in public telephone and telegraph services) and duopoly elements (in the competition for private lines and broadband services); by Canadian ownership (Bell Canada), foreign ownership (GTE) and public ownership (Manitoba, Saskatchewan and Alberta systems) as well as private stock-holder ownership; by vertical backward integration, and by competitive sectors (for example, the computer utilities). Similarly, the regulation of the telecommunications industry is quite differentiated.

The two major telephone companies incorporated under federal charter are Bell Canada and BC Telephone and both companies are regulated by the Canadian Transport Commission, a federal body which is also charged with the regulation of Canadian National-Canadian Pacific Telecommunications. Jurisdictional powers of the CTC derive from the Railway Act and the acts incorporating the companies. The remaining telephone companies fall under provincial regulation and in most cases are regulated by special provincial commissions. Saskatchewan Telecommunications had no special supervisory

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[12] Ibid., pp. 4, 7.

board, but instead the company reports directly to the Provincial Government.

The Department of Communications has the responsibility of licensing all users of the radio spectrum, and therefore the federal government has at least some control over the activities of the provincially incorporated companies. Technical approval from the DOC is also required in the operations of CATV companies, this authority stemming from the Radio Act. In addition, CATV operations fall under the jurisdiction of the Broadcasting Act and the regulatory agency created by that Act--the Canadian Radio-Television Commission.

From the above, it is apparent that it is becoming less and less possible to speak of a communications or telecommunications "industry." As the Department of Communication's Report of the Telecommission pointed out, through corporate interconnections, the tie of broadcasting to the common carriers through CATV, the interdependencies between the telecommunications and data processing and the ties of the latter to computer manufacturers, the industry boundaries are very blurred.[13] The existence of so many regulatory commissions at two levels of government, each one concerned with specific aspects of the communications "industry" points to a lack of effective planning at any level. One observer has remarked:

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[13]Department of Communications. Instant World (Ottawa: Information Canada), 1971, p. 171.

> The communication media systems of the Twentieth Century are universal solvents defying containment. They cross and interweave legal areas, property rights, tortious liability, social areas, culture, education, continually technologically innovative, defying all constraints rendering linguistic, cultural, national and geographic boundaries permeable multities.[14]

The Telecommunications Industry has shown a remarkable growth over the past 25 years as Table III-3 shows:

Table III-3. Telecommunications' Contribution to GNP (In Billions of Current Dollars)

Year	Estimated Contributions to GNP by Telecom ($ billions)	GNP ($ billions)	Telecom as % of GNP
1945	.11	12	.9
1955	.34	28	1.2
1965	.81	55	1.5
1968	1.1	71	1.6
1980(e)	3.1	181	1.7
1990(e)	7.2	374	1.9

Source: TCTS. "Telecommunication Carriers Market Projection and Analysis," Submission to Telecommission Study 2(e), 1970, p. 28.

Similarly, the cable television industry has experienced impressive growth over the past several years (see Table III-4).

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[14]The Special Committee on the Media, Osgoode Hall Law School. Submission Regarding Canadian Radio-Television Commission Examination of Policies and Regulations for the Licensing and Operation of CATV Broadcasting Undertakings--Community Broadcasting. (Mimeo) (Toronto), 1971, p. 20.

Table III-4. Size and Growth of CATV Industry (1967-69)

Year	Number of CATV Systems (operating)	Number of Outlets	Total Industry Revenues
1967	314	516,484	$22,114,690
1968	377	710,076	31,285,513
1969	400	923,811	37,379,909

Source: Dominion Bureau of Statistics. Community Antenna Television-Services de Télévision à antennae collective. Catalogue no. 56-205 (Ottawa: Queen's Printer), 1970, p. 9.

Some experts feel that the technology to be used in the wired city in the period 1985-1990 is now well-known and that creation of the wired city will only involve the synthesis of already-existing communications systems. A switched system uniting coaxial cable and copper pair cable into a more complete system, for instance, could handle many more services than current systems are capable of accommodating.[15]

Current telephone technology has been designed for voice communications and hence is unsuitable for "total" communications. Such systems, do, however, possess the advantages of complete switching service and can transmit bi-directionally. However, the use of pairs of copper wires

[15]John de Mercado. "Switched Multiservice Cable Systems--The Wired City," Dept. of Communications Seminar on "The Wired City." Univ. of Ottawa, June 25 to 28, 1970. (Mimeo), p. 3.

in the local distribution facilities (or local "loops") of these systems means that the bandwidth or message-carrying capacity of the systems is severely limited and for this reason, the system must be limited to voice or low speed data. The typical useable spectrum or bandwidth for a copper pair is 1MHz; by way of contrast, a single television signal required 6MHz of bandwidth which is equivalent to 600 telephone signals.[16]

To sum up, the present telephone systems are "capable of voice information, data, and slow-scan television signals. These systems utilize space division of services (one pair of conductors required for each service) with centralized switching."[17] Long-haul transmission facilities consist of coaxial cable or microwave. Signals pass through the telephone system in analogue[18] form and except for local loops frequency division multiplexing is used.[19]

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[16] Ibid., pp. 9, 20.

[17] W E. Evans. "Multi-service Coaxial Cable Distribution Systems--One Look at their Future," Submission by Canadian Cable Television Association to Telecommission Study 8(d) (Mimeo), 1970, p. 1.

[18] Electrical signals can be in either analogue form or digital form. The former is continuous in time, while the latter is discrete in time, i.e., on-off.

[19] In order to keep separate electrical messages (i.e., to avoid interference) several techniques can be used; (a) space division multiplexing (SDM) whereby separate cable and amplifiers are used for each message. In broadcasting, transmitters geographically distant are space-division multiplexed; (b) time division multiplexing (TDM), whereby messages are broadcast at separate moments in time. In principle, many users can share a line and each can receive messages or fractions of messages for microseconds, after which other users

By way of contrast, existing CATV systems have 300 MHz of useable bandwidth[20] and are able to carry 30 or more television channels. However, cable television systems have no switching facilities so that at present it is impossible to address messages to particular households. Coaxial systems thus far are used only for local distribution and there is no long-haul interconnection of systems.[21] Present CATV systems are generally incapable of bi-directional transmission. These systems employ frequency division multiplexing exclusively.

Apparently, the telephone companies at present plan to increase the distribution capability at each subscriber terminal from one pair to three pairs of copper wire, thus giving video phone capability to the telephone system. The time expected for completion is ten to fifteen years.[22]

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receive their messages. Then the original user's message is continued a few microseconds later. The economy achieved using this method is through the sharing of facilities; (c) frequency division multiplexing (FDM) whereby the messages use the same cable plant but may be separated due to their different frequencies. For bidirectional use, diplex filters may be used, which can use common amplifiers. There is a reduction in available spectrum, however, since part of the spectrum is reserved for each direction; (d) a fourth system, known as the closed loop system combines FDM and TDM. See TV Communications, January 1969, pp. 90-95.

[20] TV Communications, October 1968, p. 82.

[21] Mercado, op. cit., p. 8.

[22] Ibid., p. 10. This would give each subscriber a useable bandwidth of 1 MHz. Some consideration is also being given by the telephone companies to developing a switched coaxial cable system. See Dept. of Communications, Telecommission Study 8(d), op. cit., p. 47.

Many concepts of the wired city rest upon the potentials of a switched coaxial cable system. At present, most municipalities have both a switched system and a coaxial cable system, but the two systems are not integrated. W. Evans lists the four general approaches that may be followed in order to attain such integration--"(1) integration of cable television services into the present telephone system, (2) integration of telephone services into the present cable television system, (3) adoption of presently known technology to produce a new system capable of total service carriage, (4) optimization of the two existing systems on a spatially separate basis to provide total telecommunications service."[23]

While each of these alternatives doubtless presents peculiar technical problems that would have to be solved, such considerations do not appear to be of paramount importance for this discussion. Of more importance, these four alternatives set out differing industry structures, and each structure could be expected to lead to differing performances.

The following section discusses the four alternatives in turn.

III. Alternative Proposals for Structuring the Wired City

(i) Absorption of cable tv systems by the communications common carriers

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[23]Evans, op. cit., p. 2.

Integration of cable television services into the present telephone system is, of course, the position favoured by Bell Canada and the Trans-Canada Telephone System. As stated in footnote 22 of this chapter, the telephone companies are presently giving consideration to implementing a switched coaxial cable system over the next 10 to 15 years. Since the telephone companies own over 70% of the coaxial cable used in CATV systems, and lease this cable to the cable television companies on generally a ten-year contract, within ten years the telephone companies will have clear title to the coaxial cable, with no obligations to the CATV firms. The common carriers, then, will be well-positioned to implement some sort of wired city concept in about 10 years, and barring government moves to protect the small cable tv firms, can effectively dispose of any competitive threat from such companies simply by refusing to renew the lease agreements.

There may be several advantages to an approach that would give the common carriers complete control over the wired city. Such possible advantages are described by the TCTS in submissions to the Telecommission and such advantages are listed below. The TCTS states that "there are many long term advantages associated with having one general integrated intra-urban distribution network rather than special purpose networks built and operated independently.... The first step in integration is to center the network on the telephone switching center and use the telephone system for the

electronic control and supervision of the wideband facilities."[24]

Among the advantages that may result from a policy of integrating cable television firms into the telephone industry are the following:

(1) Absorption of cable services by the telephone could avoid wasteful duplication of facilities.[25] Were two coaxial systems to serve identical territories (one devoted to telephone and related services, the other to cable television and related services), there is a strong possibility that neither one would be used to capacity, and hence provision of the service would be more costly than were only one system present that could be used to capacity.

(2) A single telephone-cable television structure would be more convenient from the public's point of view.[26] The single structure would avoid unnecessary construction, digging, etc. and would be more aesthetically pleasing.

(3) Control over CATV by the common carriers would lend itself to the "functional dissociation of the message content from the control of the means of transmission."[27] This agrument is intended to reflect the fact that CATV systems are

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[24]TCTS. Submission to Study 8(d), op. cit., pp. 5, 7.

[25]Ibid., p. 5.

[26]Ibid., p. 6.

[27]Ibid., p. 7.

currently encouraged to originate their own programming. However, one should quickly add that there is a growing practice of turning over some CATV channels to common carrier use. For example, systems regulated by the New York City Public Service Commission must presently provide two such public access channels on a non-discriminatory lease basis, and by 1974 this will expand to four.[28]

Also such an approach, i.e., a limited common carrier status for CATV, has been recommended as a means of providing the financial base to encourage CATV to expand into non-video functions.[29] With the very great message carrying capability possessed by coaxial cable, there may not be any great harm in allowing the owner of the cable to have control over the messages flowing on a very small portion of the spectrum.

(4) Integration of the wide-band system with the telephone switching system, "utilizing the existing capabilities of the telephone system would be conducive to an orderly and speedy development of the network."[30] If the communications system requires planning, and if such planning can best take

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[28]William Jones. Regulation of Cable Television by the State of New York (New York: New York Public Service Commission), 1970, p. 150, ff.

[29]Leland Johnson. The Future of Cable Television: Some Problems of Federal Regulation (Santa Monica: Rand), 1970, p. 55.

[30]TCTS. Submission to Study 8(d), op. cit., p. 7, and TCTS. Submission to Study 4(b), op. cit., p. 15.

place within the regulated monopoly structure and if competition interferes with the planning process in such a way as to be against the public interest, such integration should be considered desirable. While such development would no doubt be considered "orderly," it is open to question whether it can be considered "speedy." To the latter point we shall return directly.

(5) Regulation of a multitude of carriers may be more difficult than regulation of a few.[31] Rather than supervising a large number of independent cable companies, the regulators would need supervise only a few common carriers, and, in this view, it should lighten their task.

(6) Since the telecommunications carriers have years of experience and knowledge derived from the provision of communications services, the carriers, may be best suited to implement expanded communications capacity through coaxial cable.[32] In this view, the carriers can provide the new services most economically because they have established rights of way and can add to capacity incrementally, whereas a cable television firm of necessity adds to capacity in a lump sum manner and, unless relying on the carriers' rights of way, must negotiate anew easements and rights of way.

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[31]TCTS. "Relationships Between Common Carriers, Computing Companies and Information and Data Systems." Submission to Telecommission Study 5(a,c,d), 1969, p. 4, Part 3.

[32]TCTS. "Analysis of the Relationship Between the Functions of Common Carriers and Those Engaged in Broadcasting." Submission to Telecommission Study 1(d), 1970, p. 5.

(7) In order to supply service in all areas at reasonable rates, it is necessary to invest the coaxial cable technology with the common carriers who are in a position to undertake a system-wide averaging of costs and rates and thereby subsidize the high cost areas from revenues derived from the low cost areas.[33] As Chapter II has shown, the chances of rural areas receiving CATV service under current costs and industry structure are slim. Cross-subsidization through the monopoly corporation would be one way of ensuring its availability.

(8) The final argument noted here in favour of the absorption by the carriers of CATV is now quoted fully from the TCTS' brief to the Telecommission.

> Federal Government regulating powers under the Broadcasting Act do not extend to cover all the activities permitted under the CATV Company's Charter. In the absence of Provincial Legislation, a CATV Company which owns its own cable, is potentially unregulated in data transmission and private wire services.
>
> The Federal Government, by passing Bill C-11, has indicated an intention to regulate private wire and data transmission services provided by federally regulated carrier companies. If federally regulated companies own the cable, the federal regulatory power indirectly extends to CATV companies served by these carriers through the contract restrictions of the federal carriers....
>
> Similarly, any future regulation of private wire and data transmission services by Provincial Governments would be facilitated if the provincially regulated common carrier companies owned the cables used for CATV distribution networks.[34]

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[33] TCTS. "Interconnection of Private Systems," Submission Study 9(b)(i), 1970, p. 14.

[34] TCTS. Submission to Study 1(d), op. cit., p. 4, Part 2.

In other words, if the governments do not possess the capacity to regulate, Bell certainly does. In addition to providing regulated common carrier services, Bell would itself like to become the designated regulator of communications services. As will become apparent later in this chapter, the carriers do now in effect possess a great deal of regulatory control over cable television firms and have not been reluctant to exercise this power. While regulation is generally felt to be best implemented directly by governmental bodies in an effort to promote the public interest, the TCTS' policy proposal provides an interesting type of arm's length governmental regulation.

However, in spite of the possible benefits that may accrue to society through a policy of allowing the carriers' to gain complete control over CATV, mention should also be made of certain disadvantages that may flow from such an approach. Such possible disadvantages are now briefly discussed in turn:

(1) by structuring all wire communications within a single carrier, there may arise an inconvenience to the public in times of crisis, eg. during labour disputes. If the operation and maintenance of the cable were to be vested in a single entity, every communications service on the cable could be adversely affected during such crisis, as opposed to only single services, such as telephone or CATV service, under a system of segregated functions.

(2) By structuring all wire communications within the common carrier complex, the carriers will have greater freedom to price discriminate due to the lack of effective competition. In fact, a TCTS brief states "the evolution of an integrated intra-urban network will depend ultimately on the demand for the telecommunications services carried by such a network at rate levels in keeping with the value of service...."[35] In other words, after pleading that the wired nation be turned over to the common carriers, the concept of the common carrier implying access at non-discriminatory rates, the telephone companies have let it be known that they intend to price discriminate. Given the proposed pricing mechanism, one may wonder whether access to cable spectrum might not on average be cheaper were there a certain amount of competition allowed in the provision of the distribution facilities or at least were the monopoly owners not profit seeking enterprises.

(3) Regulation of many firms may be easier than the regulation of a few. Competition may remove some of the necessity for regulation since competition is a regulator itself; in general, the more competition that exists, the less needed is detailed governmental supervision. Also, some amount of competition may serve to weaken the political and economic power of the carriers and serve to strengthen the

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[35]TCTS. Submission to Study 8(d), op. cit., p. 7 (emphasis mine).

hand of the under-staffed regulatory commissions (c.f. p. 124 intra).

(4) Full integration may slow technological advance and delay implementation of the wired city concept. Innovation without the competitive spur may be delayed in order that existing capital may be fully amoritised.[36]

TCTS states that paired copper cable possesses sufficient bandwidth to provide service for all of today's two-way communications needs, including telephone and video phone.[37] For future needs, they suggest that the voiceband network (copper pair) and the wideband network (coaxial cable) complement each other by maintaining the switched two-way telephone and one-way wideband services. It is also felt that switched coaxial cable service is not at present economically feasible.[37a]

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[36]Says the TCTS, "so-called 'planned obsolescence' has never been encouraged by the telecommunications carrier industry--as on the contrary equipment is generally built to last a lifetime, but nevertheless the effects of a shortened product cycle is '[sic] being felt at both the operating and manufacturing level and is a prime reason why a strong R & D capability is a necessity for survival as far as any manufacturing concern in the telecommunications field is concerned." TCTS, "Research and Development Policies and Programs in Telecommunications. The Reason for Conducting R & D. (a) The Effect of Vertical and Horizontal Integration." Submission to Study 4(b), 1970, p. 34 (emphasis mine). One has cause to wonder whether innovation will be introduced at an "optimal" rate when the chosen instrument for communications innovation has also a vested interest in delaying innovation so that obsolete capital may be written off.

[37]TCTS. Submission to Study 8(d), op. cit., p. 8.

[37a]Ibid., p. 13.

However, in the United States, the FCC may soon require some limited two-way capability for CATV systems[38] and New York City is demanding that its cable systems possess the message filtering capacity so that video programmes may be "addressed" to local neighbourhoods, school districts, Congressional districts, etc., and that the systems have the capability of transmitting simultaneously signals to one or more of these districts, the area to receive a particular programme to be determined by the message itself.[39] From this degree of development it is not difficult to foresee a point in time when each individual household will be able to receive electronic messages "addressed" specifically to that household.

Therefore, much can be done in progressing toward the wired city without a switched coaxial cable system. All that is lacking in a system with filters allowing for discrete message delivery capability is the capacity for each individual subscriber to send (rather than receive) information requiring a large bandwidth to a selected household. Voice-grade messages can be sent to individual subscribers via the telephone system; wideband messages can be sent to a central source by means of the coaxial cable system; however, wideband messages cannot be sent by individuals to individuals without the switched coaxial system.

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[38]Jones, op. cit., p. 91.

[39]Ibid., pp. 152-3.

It would be quite possible for CATV systems to provide many of the services foreseen today without entering into competition with the telephone companies (such as facsimile delivery of mail, newspapers, etc.; voting, shopping, etc.). And through the provision of such services these companies would gain both the experience and financing necessary to introduce new services. However, the telephone systems believe that coaxial cable should be presently limited to a one-way, mass distribution system, and they have employed restrictive contracts to ensure that such remains the case. And in the meantime, they are laying plans to introduce a wider bandwidth in 10 to 15 years' time (see footnote 22).

(5) Full integration may increase the opportunities for unfair competitive practices by the carriers in other areas and inhibit technological advance in industries vertically related to communications distribution. Both of these possibilities originate in the monopoly position of the telephone companies over the communications wires and involve the inter-connection policies of the monopolised public system with private communications systems and with terminal devices. The past policies in this matter have been summed up as follows:

> The TCTS Companies have continued to oppose the accoustical or hard-wired connection of a radio system to the public switched network as a general practice for other than public emergency services. This position has not necessarily been maintained so much from a technical aspect as from the economic concern that such a precedent would establish for systems interconnection.... To allow private systems to interconnect in this way leaves the carriers reduced revenues

to offset the costs of providing public calling and erodes the revenue base on the long haul circuit by-passed by the private user.[40]

On the other hand, CN/CPT generally allows inter-connection of private systems with its network, and similarly the smaller telephone systems are said to be more flexible. The only requirement is that such systems be technically compatible with the public systems.[41] The common carriers possess "almost complete discretion" on inter-connection. When private-line circuits are leased from the TCTS members, there appears to be little difficulty in obtaining inter-connection privileges. It seems then that the telephone companies are able to maintain a competitive advantage in the provision of such services to their monopolised public switched network service.[42] Such policies serve to limit competition not only in the provision of private-line services but in research and development efforts by independent

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[40]TCTS. "Interconnection of Terminal Devices," Submission to Telecommission Study 8(b) (iii), 1970, p. 3.

[41]Department of Communications. Instant World, A Report on Telecommunications in Canada (Ottawa: Information Canada), 1971, p. 151.

[42]Ibid., p. 153. In fact, TCTS does not allow interconnection for CN/CPT's broadband data-transmission service, which severely limits CN/CPT's ability to compete for private-line service. The Telecommission sums the issue up in the following terms: "In general, there are grounds for supposing that, except for private systems leased entirely from the telephone companies, interconnection with the public switched network is difficult to obtain and is the exception rather than the rule, and that this attitude appears to be governed more by commercial than by technical issues." Ibid., p. 155.

equipment manufacturers.[43]

Similar restrictions often apply to the attachment of "foreign terminal devices," although they are less severe. TCTS has rigid interface equipment requirements, the interface equipment being owned by the telephone companies, in order to maintain the integrity of the switched network. Some feel that these attachment requirements may unnecessarily impede technological advance, since the carriers often appear to be slow in responding with new interface equipment when new requirements arise. Also, "the requisite protective devices [may] give the carriers an unfair competitive advantage by adding to the cost of user-owned systems, costs which indeed cannot even be calculated for a new device until the carrier has designed and costed the requisite interface buffer."[44]

In the United States, the Federal Communications Commission has in the past "generally accepted tariffs which prohibit customer-owned equipment from being attached to the carrier's switched lines. The carriers have employed these tariffs to exclude plastic covers for telephone books,

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[43] See Manley Irwin. Vertical Integration in the Communications Industry: A Public Policy Critique Report to the President's Task Force on Communication Policy. (mimeo), undated, pp. 4-9.

[44] Instant World, op. cit., p. 157. The Report adds, "For the manufacturers of telecommunications terminal equipment, the inter-connection practices of the carriers appear to add one more economic hurdle to the successful marketing of Canadian products." Ibid., p. 155.

shoulder telephone rests, hush devices....[45] In Canada, such tariffs have not been regulated at all.

It is evident that as the traffic handling capacity of the communications system is enlarged through coaxial cable, the number and variety of foreign devices seeking attachments will grow, simply because the network will have the capacity to handle more data of a higher informational content.

In March, 1971, Bell Canada announced the planned creation of a new computer-communications division, and anticipated investments of up to $200 million in new data-communications facilities over five years.[46] In the same month, TCTS announced the construction of a nation-wide digital transmission network for data communications. TCTS is also developing a new digital terminal device to connect computer equipment to the new digital network.[47]

The Trans-Canada Telephone System members have also expressed an intention to enter the computer services field:

> Regulated Telecommunications Carriers should be permitted to participate in providing computer services because good communications regulation will ensure they have no preferred position re. computer processing. Hence, they should be treated as an equal. Subsidiary operation should further ensure this....[48]
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> In essence, the computer is a highly sophisticated terminal. As the country needs more computer power, and as this is the problem we are trying to solve, then

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[45] Irwin, op. cit., p. 10.

[46] Financial Post, Sept. 11, 1971, p. EDP 10.

[47] Loc. cit.

[48] TCTS. Submission to Study 5(a,c,e), Part 2, p. 7.

anyone capable of providing this power, including telecommunications carriers, should be permitted to do so. Of course, other considerations and options enter, e.g., the possibility that large companies might manipulate computer service and telecommunications costs to their advantage.

These are separate problems. If there is a fear of monopoly or unfair competition, then the government should legislate or regulate in this context, to ensure that it does not happen, now or in the future. It might be argued, for example, that carriers could use their monopoly position on regulated telephone services to subsidize rates for computer communication facilities, thereby securing an unfair advantage over competitors.[49]

It would be intolerable to allow the carriers to compete in the computer services industry without regulation, since regulation in the monopolised sectors would become meaningless and ineffectual. At the same time, cross-subsidisation of

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[49] Ibid., part 3, p. 2. It is interesting to note TCTS's response to the obverse question--Should non-carrier processors be permitted to provide communication services for computer users? Their answer is generally no, due to duplication and waste of resources that would result, the fact that only the telephone company can provide voice, data, and video communications from a single corporate entity, the likelihood of "cream-skimming," and because "regulation of a multitude of carriers is far more difficult than regulation of a few." Ibid., part 3, p. 4.

Interest has also been expressed by the TCTS members on entering the broadcasting industry. They state, "While the common carriers have no intention of engaging in broadcasting as such ... there would appear to be no reason why common carriers should be excluded from being broadcasters. Common carrier companies have enjoyed a high reputation for ethical conduct and would not relish the distinction of being the only Canadian companies deemed so unsuitable as to be barred by law from being broadcasters. On the other hand, if a firm principle of government policy should call for the separation of the medium and the message, and this principle would apply equally well to the broadcasters and the common carriers, the TCTS companies would not object to such a separation of functions." TCTS. Submission to Study 1(d), part 2, p. 7.

revenues from the monopolised areas to the competitive areas could severely damage competition in the latter area.

The more serious question is whether the carriers should be allowed to extend their regulated activities into the computer services field. This approach would involve two major problems. First, it would be very difficult to provide effective regulation. As a Department of Communications' report states:

> Bill C-11 to amend the Railway Act seeks to prevent cross-subsidization by subjecting all telecommunications services offered by the carriers to regulation, and requiring them to demonstrate the validity of the cost allocation on which tariffs are based. Historically, it has always been found difficult to identify true costs, even for particular elements of telecommunications services. For this reason, a tendency has developed to set total rates of return for the entire operation of the carrier, and to question the costs of specific services only when there is evidence of abuse. The enormous complexity of a horizontally integrated computer utility offering raw computer power, communications, and application services might make it extremely difficult for a regulatory body to arrive at a valid allocation of costs....[50]

In the second place, if effective regulation were possible, so that Bell could not use its monopoly position in the public message service to harm competitors in the computer services field, one is faced with the anomaly of a competitive industry in which only one of the competitors is regulated as to rates and service. Unless the telephone-owned subsidiaries proved to be much more efficient than

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[50]Dept. of Communication. Communications Canada. Participation by Telecommunications Carriers in Public Data-Processing (Ottawa), 1970, p. 42.

other firms, the regulatory process would tend to make such competition quite weak. Any delays in approval of rate changes would place the telephone competitors at a severe disadvantage.

If the telephone companies are allowed to enter the computer services field, even under regulation, a great danger exists that restrictions on interconnections and attachments imposed by the carriers could force subscribers into purchasing computer services from the telephone companies. Certainly, the past record of the carriers does nothing to alleviate this concern. In such a case, some limited form of competition for the telephone companies as could be provided by CATV companies could go far in removing such a threat. The competition between the long-haul duopolists (CN-CPT, and TCTS) may be sufficient to remove this threat for city to city communications. CATV could help remove the problem for intra-urban communications as well.

In conclusion, by avoiding the absorption of CATV firms by the common carriers, competition may be encouraged in not only message distribution but in other related areas, and so some of the abuses of monopoly may be avoided.

(ii) Integration of telephone services into the present cable television systems

There do not appear to be any vocal advocates of the position that cable television companies be permitted to absorb the functions of the telephone companies, due chiefly,

no doubt, to the political unreality of the suggestion. Since such a proposal, involving as it does the complete disintegration of the telephone complex, clearly ignores the enormous economic and political power vested in the common carrier corporations, little time need be spent here analysing the pros and cons of this proposed state of affairs.

Such a proposal would not permit competition at the local level, since a wide-band monopolist would have replaced a copper pair monopolist. Were rural areas to be given the high grade service to which they are now accustomed, a good deal of merger activity and centralisation of cable systems would have to be expected, in a manner similar to the route followed by the telephone companies themselves several decades ago. While governmental policy could probably ensure a more decentralised communications service than currently exists, it is impossible to predict whether or not the "optimal" degree of decentralisation would be more than marginally greater than currently is present. If it be in fact the case that economies of research and development, extension of service to rural areas, and possible scale economies due to large fixed costs in long-haul transmission and switching facilities dictate that no more than a few giant cable firms could survive efficiently, most of the difficulties inherent in the current telephone structure as described above would be transferred to the new one. It can be further noted that the transitional period would be difficult and there is

little hope that the cable television industry could raise the investment capital to undertake a project of such grand dimensions.

(iii) Adoption of a new system capable of total service carriage

Since the present chapter is only concerned with the relations between the cable television firms and the common carriers, any proposal for the complete abandonment of each service and their replacement by a completely new system need not be discussed here.

(iv) Optimisation of the two existing systems on a spatially separate basis to provide total telecommunications service

The general concept of maintaining separate but interconnected telephone and CATV systems may form the base for several types of planned telecommunications systems. The maintenance of separate control over multipair wire and coaxial cable then, does not imply any given type of system, but the advantages of such a general approach will be held in common by the alternative over-all systems falling within this general approach. The present discussion shall confine itself to an analysis of the general benefits and costs of the basic approach.

The two network approach is the position advocated by the Canadian Cable Television Association and in the United States by the American EIA.[51] The dual network would

[51]Evans, op. cit., and Electronics Industries Association, The IED/EIA Response to the Federal Communications

be composed of the following:

(a) "a multipaired network able to provide discreet-address-to-discreet-address communications (i.e., subscriber to subscriber),

(b) a broadband coaxial network able to provide a one-way service from a center to one individual subscriber, one group of subscribers, or all subscribers simultaneously with a limited amount of two-way communication from each subscriber to the central point."[52]

Such a plan makes full use of the existing telephone and CATV plants, although it implies significant technological upgrading for both systems. For example, the cable systems would require the introduction of integrated circuit broadband amplifiers capable of handling the larger spectrum anticipated, complex filtering designs, and some two-way capability.

One of the benefits of such a dual system as seen by the CCTA is that most of the present services and anticipated services to be provided in a wired city could be allocated to one system or the other by the inherent technological

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Commission Docket 18397, Part V. The Future of Broadband Communications (Washington: EIA), 1969. See also, "Present and Probable CATV/Broadband--Communication Technology" by John E. Ward, printed as Appendix A in the Sloan Commission. On the Cable. The Television of Abundance Report of the Sloan Commission on Cable Communications (New York: McGraw-Hill, 1971).

[52] Canadian Cable Television Association. Telecommission Study 1(d), (Mimeo), April 1970, p. 11.

advantages the one system would possess over the other for each service. For example, proposed services that would be allocated exclusively to the cable television (or more properly "broadband") network, those services necessitating high quality video and some addressing, would be the following--television broadcasting (including ETV), FM broadcasting, shopping in the home, traffic and crime surveillance, stored television,[53] and selected audience programmes (e.g., to doctors, teachers, etc.). Services to be allocated exclusively to the telephone network would be comprised of services that require total addressing but little or no video, and would include telephone service, picture phone service, voting in the home, meter reading, burglar and fire alarm and banking in the home. Services that would be suitable for both the broadband network with limited return pulse facility and the telephone network would include facsimile,[54]

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[53]Stored television, or "dial-a-programme" would allow a subscriber to view any programme contained in a central television "library" at a time most convenient to the viewer. The programme would be addressed to the particular viewer.

[54]With regard to library books, the CCTA brief states, "A facsimile unit in the home can produce either printed sheets or display specific information on a storage picture tube. The information can arrive at the subscriber either over the broadband network in the form of high resolution images, or via the telephone network in the form of pulses. The information can either be called for specifically by an individual subscriber as in the case of, say, a housewife calling for a recipe, and the information sent either via the telephone network or broadband network with the information pre-addressed to the subscriber using a channel reserved for this purpose: or the information can be made available on a general basis as with, say, a newspaper and the subscribers would, with facsimile equipment, either receive all

library books,[55] and computer communications.[56]

One may dispute whether such an allocation of services is actually necessary or even desirable. A communications duopoly, in which the duopolists are unable to compete because of a strict limitation on the range of services that may be provided by each, may not be significantly more desirable than the present telephone monopoly, or than allowing the telephone companies to absorb the broadband functions. The one chief advantage that may be foreseen lies in the reduced probability that any crisis could disrupt all electronic communications in an area.

However, the main potential benefits to be derived from the dual network system stems from the introduction of actual or potential competition between the carriers, thereby lessening the load of the regulators. Economic theory has established that in cases in which duopoly exists and fixed costs form a high percentage of total costs, destructive price cutting is likely to take place until one of the duopolists is forced to leave the industry. Therefore, unlimited

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the news, or by suitably preceding the facsimile equipment, the receiving terminal would select only those items of news which the householder had programmed to be received. This entire area of facsimile is one which should be left open to competition by all interested parties and the users would decide which service is most worthy of their support." Ibid., p. 15.

[55]A print-out of a book the size of Gone With the Wind could be completed in about 15 seconds. Ibid., p. 16.

[55]Ibid., p. 12.

competition in all services cannot be allowed to exist between the two systems or else none of the (long-term) benefits of competition will endure. One solution might be to maintain the legal monopoly positions of the telephone companies in telephone service and of the CATV companies in relaying broadcast television signals and to allow open competition between the two elements of the dual network in all other areas. The monopolised areas would, of course, remain subject to public utility regulation.

However, this approach still poses the difficult problem of prohibiting the cross-subsidisation by the telephone companies of services in the competitive sector by revenues derived from the monopolised telephone services with the effect of eliminating competition from the cable companies in those areas in which they are legally allowed to compete. The difficulties in separating out overhead costs and allocating them to specific services, in order to ensure that such cross-subsidisation does not take place has been already noted above (see page 135). One likely result of such competition is, then, that rates both for telephone service and for CATV service would be forced upward in order to permit low rates in the competitive areas. A second possibility is that all competition by the cable companies would be destroyed and such companies would be forced to withdraw into the provision of only CATV service. So some method must be found to protect the subscribers to the monopolised

services so that they are not subsidising subscribers in the competitive areas. The problem is obviously aggravated if the present regulatory system is continued whereby the telephone systems and CATV systems fall under different regulatory jurisdictions, often at different levels of government. The body charged with regulating the telephone companies, for example, may not be terribly concerned with the effects of rate levels established by the telephone companies upon the competing broadband cable systems when the responsibility for regulating these latter systems falls elsewhere.

It must be concluded, then, that a dual system approach involving both competitive and monopolised sectors may be subject to certain abuses. It is difficult to predict to what extent such possible abuses might be prevented were both elements of the system to be subjected to regulation by a single body. At the very least, actual anti-competitive practices would receive a full airing before the regulatory commission by the aggreived party under such a regulatory system. Effective regulation would do much to placate the concerns expressed above.[57]

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[57]Dallas Smythe states that the only certain method of preventing the abuses that a publicly-sanctioned monopolist would inflict upon competitive sectors of the communications industry is the complete segregation of the competitive and monopolistic sectors and strict prohibition of all activities by the monopoly corporation in the former sector. In his words:

"This is to say that the foundation of telecommunications organization in Canada should now be (a) a functional separation between transmission channels and local facilities (toll centers, exchanges, local loops or grids and terminals), and

On the other hand, the approach under present consideration offers several potential advantages over the other methods previously discussed for integrating CATV and telephone networks into the wired city concept. In the first place, such a plan is less rigid and more open-ended than the others considered. As Professor Gainer has said:

> The role of wired television operations in Canada's major cities has not yet stabilized fully in terms of the ultimate broadcast and closed-circuit content options available to households. For this reason, the direction of current policy prescriptions for the future should remain flexible to allow for the possibility of quite striking technological innovation in the fields of one-way selective or possibly two-way selective broadband transmission in the hands of the ultimate user.... The direction of these developments in the future may indicate a shift in the long-run cost advantages of any particular pattern of ownership and control of cable and other outside plants.[58]

(b) a deliberate 'market' definition (reviewable from time to time), as between the 'monopoly' and 'free market,' or more simply 'market segments.' Entities engaged in the monopoly or market segments must be totally independent of each other, i.e., free of all ownership, contractual or other legal constraints between them." Dallas Smythe, "The Relevance of United States Legislative Regulatory Experience to the Canadian Telecommunications Situation," Telecommission Study 1(e) (Ottawa: Information Canada), 1971, p. 184.

In Smythe's view, the only remaining area in telecommunications that is essentially monopolistic in nature is the local switching and local distribution facilities of the telephone and telegraph plant (ibid., p. 170). If my analysis is valid, CATV could provide effective competition in the local distribution system as well, thus leaving the switching terminal as the only inherently monopolised area.

[58]Walter Gainer. "The Canadian Telecommunications Industry: Structure and Regulation," Telecommission Study 2(a) (Ottawa: Information Canada), 1971, pp. 100-101.

One of the merits of the proposal is, then, that there is no foreclosure of future options at a stage when none of the potential services have even been offered.

While the TCTS argued that any dual system could involve "wasteful and costly duplication of telecommunication facilities which can carry the same or similar services,"[59] in actual fact for most municipalities in Canada, two systems presently exist and are quite profitable. Limiting cable companies to CATV service, or allowing the telephone companies to take over CATV functions would not change that fact. Since the technologies suggested for each of the parallel systems are significantly different (one a multi-paired system with switching capacity, the other a broadband system with filtering capacity), there are enough services that must be devoted to one system or the other to make maintenance of each system worthwhile. The only valid concern then would be whether the extra costs incurred by each system in providing services in the areas in which they both competed could be significantly reduced were competition eliminated in these areas. There is no way to pass judgment on this last point at this moment in time.

What the dual system does achieve, however, is the removal of some of the arbitrary power over interconnection of private services and attachment of "foreign terminal devices"

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[59]TCTS. Submission to Study 8(d), op. cit., pp. 5, 7. See the discussion on page 122 supra.

currently enjoyed by the telecommunications common carriers. The availability of two communications networks should lower the price of access to each network due to competition, which should serve to expand the uses made of both systems. Easier access would also encourage the technological development of new equipment for attachment and increase the receptivity of the carriers regarding the provision of transmission lines capable of handling these new developments. Therefore, technological change in both the terminal manufacturing field and in the carrier industry itself would be encouraged.

Any argument to the effect that the telephone companies to-day possess sufficient transmission capacity to provide for all present and immediate future requirements should not be taken seriously. In the first place, demands upon the system for services such as facsimile will not be made until the system has the capacity for handling it and companies try to sell their service. In the second place, as Gainer states,

> The argument of a particular enterprise that it already has fixed facilities available for other purposes, and that these can readily be utilized more fully in some additional direction at low added variable cost, is not a convincing argument from the standpoint of ultimate efficiency in the use of resources. This is so because the (apparently excessive) bundle of resources later representing under-utilized fixed overhead facilities was at one time purchased away from other alternative uses. The initial (marginal) opportunity cost of these resources, if the investment was justified at all, must surely be such that users of final services produced with the aid of the fixed resources are willing to pay prices for those services over time which will justify the initial commitment to overhead--and prices by the same token which would justify further lumpy replacement of comparable overheads from time to time as technology may demand.[60]

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[60]Gainer, op. cit., pp. 91-92.

In conclusion, then, cable television systems offer a grand opportunity for the introduction of new competition into the intra-urban common carrier industry. In areas in which the broadband and telephone carriers are allowed to compete, the regulatory burden should be lightened and technological change encouraged. In the monopolised areas, however, the regulatory bodies will probably find their task more difficult since they will be charged with the task of preventing undue cross-subsidisation of services.

IV. Telephone Company Restrictions

This section documents the restrictive measures imposed by the telephone companies on the CATV systems which have the effect of foreclosing potential competition between the two systems and of raising the costs faced by CATV systems. To be discussed are arbitrary rate charges, pole attachment rights, restrictions on uses made of cable, and control over the type of messages transmitted over the cable, interconnection policies, leaseback and partial system agreements, construction costs, and other restrictive practices. Before proceeding, however, a short discussion is presented on the evolution of the relationship between the telephone companies and cable companies and the power of the telephone companies over CATV systems.

In 1880, under a Special Act of the Parliament of Canada,[61] the Bell Telephone Company was incorporated; the

[61]Statutes of Canada, 1880, chapter 67.

Act has been amended twelve times since that date.[62] Bell's charter gives the Company the power

> to construct and maintain telecommunications lines along or across public highways, the power to purchase telephone lines and to enter into arrangements with any company that is a proprietor of a telephone line or with any company that has the power or right to use communication by means of the telephone, the power to acquire real estate and the power to invest in companies engaged in telecommunications research and development.... The company's charter makes it mandatory for the company to provide telephone service to all applicants on prepayment of lawful rates provided, however, that the telephone service is to be used for a lawful purpose and provided that it is to be located within a territory to which a general service is given, and provided that it is within two hundred feet of any street along which the company has a telephone plant.
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> In 1882, Bell's charter was amended to indicate that the company had the power to extend its telephone lines throughout the whole of the Dominion of Canada. Furthermore, the works of the company were declared to be for the general advantage of Canada. In 1906, the company's charter was amended so that the company and its charter were made subject to the provisions of the Railway Act. Accordingly, the Board of Railway Commissioners, (subsequently the Board of Transport Commissioners for Canada and now the Canadian Transport Commission), was granted jurisdiction over Bell....
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> Under the Railway Act, the Canadian Transport Commission has the power to regulate all telephone tolls and rates where the tolls and rates are to be charged to the public. The government recently introduced Bill C-11 in the House of Commons, however, to amend the Railway Act. The explanatory notes to this Bill indicate, in part, that 'these amendments would remove the exemption for private wire services and would place telegraph and telephone tolls for all a company's services and facilities within the jurisdiction of the Canadian Transport Commission....'
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> The charter powers of the company permit Bell to engage in the widest possible range of telecommunications services, namely, 'the transmission, emission or reception of signs, signals, writing, images or sounds or intelligence of any nature by wire, radio, visual or other electromagnetic systems....'

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[62] TCTS. "History of Regulation and Current Regulatory Setting," Submission to Telecommission Study 1(b), March, 1970, p. 30.

> Bell's power to operate a telecommunications business is qualified, however, by further provisions contained in its charter. In particular, Bell must act solely as a common carrier, and shall not control either the contents, nor influence the meaning or purpose, of any messages transmitted over its facilities. Bell is also restricted insofar as it cannot hold, either directly or indirectly, a broadcasting licence or a CATV licence.[63]

In other words, Bell Canada (and the other telephone companies) have been given a statutory right-of-way, which is in reality a monopolistic advantage given by Parliament (and provincial governments) on the theory that the public interest is best served by the general availability of telephone service. The telephone companies have the statutory right to erect telephone poles and lay conduits and this monopolistic right-of-way confers an added value to the right of attaching wires to the telephone plant, well over and above any material value involved in the poles and conduits themselves. In most cases, the only economical method for a CATV operator, for example, to run his cable through a city is to negotiate with the telephone company for access right to the poles. In this way, he also obtains rights-of-way and easements.

In order to protect the public against the possible abuses of a telephone monopoly, the Parliament of Canada termed Bell Canada a common carrier in telephone service, implying that Bell was required to accept all subscribers onto its system at just and reasonable rates, and further subjected the company to rate regulation of telephone service. However,

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[63] Ibid., pp. 30-39.

the telephone company has not been deemed a common carrier in the supply of pole space, and for this reason it has been able to exact large concessions from applicants desiring access to the poles.

In short summary, the telephone company has been given a monopolistic right to erect poles as it was felt the public interest lay in the general availability of telephone service. However, the telephone companies have used this monopolistic privilege to exclude services by applicants for pole space, and this exclusion may well not be in the public interest.

The position of the cable companies in dealing with Bell has been summed up as follows:

> ... Bell is attempting to control coaxial cable uses and to take over as much of the field as it can, and it is in that area that we have a philosophical concern that while they may control telephones, as we are sure they do, and quite properly, that they will end up controlling CATV and, in time, all the other many uses that this electronic highway to my house and yours will represent.
>
> Our concern again is one which is reflected from the marketplace and in which any independent CATV operator wishing to install a system must negotiate with Bell for the use of its right-of-way, and there is frankly no other economic alternative route. There are other routes. We have utility poles, or in theory a man might buy his own link but I come back to economic routes, practical economic routes. The Bell is unquestionably the logical communication right-of-way. The easements they have been given are in the right location, the poles are there, the drop lines, for telephones, and these other services make them by far the most desirable.[64]

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[64] Statement of G. D. Zimmerman before Standing Committee on Transport and Communications. Minutes of Proceedings and Evidence. House of Commons, 27th Parliament (Ottawa: Queen's Printer), October 31, 1967, p. 219.

It will be recalled that under the Act respecting the Bell Telephone Company of Canada "the Company and its subsidiaries do not, however, directly or indirectly or by any other means, have the power to apply for or to be the holder of a broadcasting licence as defined in the Broadcasting Act or of a licence to operate a commercial Community Antenna Television Service."[65] What the law has prohibited Bell Canada from controlling through a licence, Bell has succeeded in controlling through its monopolistic control of telephone poles. In fact, Bell Canada exercises as much regulatory control over CATV systems as does the CRTC.

The extensive powers held by Bell over the cable television industry probably first came to public attention in early 1969 when it was learned that in practice Bell was granting cable licences in Toronto.[66] Until the passage of the

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[65]An Act respecting the Bell Telephone Company of Canada, Statutes of Canada 16-17 Elizabeth II, 1968, chapter 48, p. 46.

[66]See London Free Press, February 7, 1969; Toronto Daily Star, February 6, Feb. 8 and Feb. 20; Toronto Globe and Mail, Feb. 7, 1969; Toronto Telegram, February 7, 1969. Bell Canada's arguments in defence against these charges are contained in the Transcripts of the Canadian Radio-Television Public Hearings, Volume 6, March 1969, pp. 93 ff. (Available in the CRTC Library, Ottawa.) Bell developed a policy, according to Bell representatives, of wiring areas only for applicants who held a DOT licence, held Letters Patent, and possessed financial solvency and until 1967, would wire any and all areas for applicants meeting these criteria. After 1967, Bell decided to limit the total territory of any one applicant to 2 million square feet of cable. Negotiations among Bell, Maclean-Hunter, Coaxial Colourview and Rodgers Cable resulted in an agreement to split up all unwired areas of Toronto. In regard to the criterion of financial ability of

the Broadcasting Act[67] in March 1968, such governmental regulation of cable television as existed was implemented by the Department of Transport. The DOT laid down certain technical standards and granted licences which were not exclusive. Generally, anyone who applied received a licence to operate a CATV system.[68] At a CRTC public hearing held in February, 1969, it was disclosed that small cable firms had tried in vain to obtain cable territory in Metropolitan Toronto, that the efforts of these firms in this endeavor were frustrated because of a 5 million dollar deal between Bell Canada and five large cable companies.[69] On August 1, 1968, the Commission announced that cable companies should not expand their territories before approval had been received from CRTC,[70] but evidence was presented to show that Bell continued to sign agreements to continue wiring areas in

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the applicant, Bell required a 20% down payment in cash at the time of signing the contract of the total construction charges, and ran credit checks against applicants. See ibid., pp. 97-104.

[67] Statutes of Canada 16-17 Elizabeth II, 1968, chapter 25.

[68] Canadian Radio-Television Commission. Cable Television in Canada (Ottawa), 1971, pp. 8-10. The DOT usually refused to license cable systems with head-ends more than ten miles from the area to be served and virtually banned the use of microwave in order to help preserve local service. Cable operators were not permitted to alter off-air signals.

[69] Metro Cable TV, York Cablevision, Rogers Cable TV, Coaxial Colourview, Maclean-Hunter Cable TV were the five cable companies.

[70] CRTC, Annual Report 1968-69, p. 21.

spite of the freeze in order that the five large companies would have an established cable system when the time came to seek a licence from the CRTC. Bell had effectively "carved up" Toronto into exclusive territories for the large companies and continued to lay cable on the theory that "possession is nine-tenths of the law."[71]

Before the freeze, smaller operators could not claim territory. For example, Thomas Hollingshead held a Department of Transport licence for two areas in Toronto and had tried in vain to negotiate with Bell from early 1967. "Eventually he was told Bell had 'firmed up' agreements with six companies and the area in which he intended to operate had been demarcated for other operators."[72]

Another small cable operator, Wesley Hossick, charged that "despite written and oral applications for extension of a small cablevision operation he conducts in the Humber River area, Bell had not given him the opportunity to negotiate. The telephone company, he charged, eventually handed him a map showing no room for his intended expansion."[73]

The above short summary of CRTC findings should serve to show the almost complete control held and exercised by the telephone companies over the CATV industry. The reader is referred to pages 125ff <u>supra</u> wherein a discussion is

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[71] <u>Toronto Star</u>, February 6, 1969.

[72] <u>Toronto Star</u>, February 20, 1969.

[73] <u>Loc. cit.</u>

presented regarding the quote from a TCTS brief: "If federally regulated companies own the cable, the federal regulatory power indirectly extends to CATV companies served by these carriers through the contract restrictions of the federal carriers."[74] It would appear, then, that Bell is not even now, with the passage of the Act, ready to abdicate its regulatory control over cable television to the Government of Canada.

The remainder of this section discusses restrictions contained in telephone company contracts and attempts to assess the reasonableness of Bell charges.

Primary attention will be paid to the Bell Telephone Company of Canada for two reasons. In the first place, Bell is by far the largest of the telephone companies and restrictions stemming from this single source will have a larger impact on the cable television industry as a whole than restrictions stemming from any other single company. In the second place, Bell is a private, shareholder company in contrast to the provincially-owned companies in the Prairies. Restrictions imposed by these latter companies may be interpreted as government policy, whereas Bell restrictions are simply the case of a huge private monopoly exerting power into other fields. In recent years, Bell has relaxed some of the restrictive measures imposed on CATV firms and when other

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[74] TCTS. Submission to Study 1(d), op. cit., p. 11.

restrictions are applicable to contracts signed by the other telephone companies and are not contained in the Bell contract they will be cited.

Bell Canada has two standard contracts, both of which are "leasebacks." The partial system agreement is less restrictive than the complete system agreement and for this reason is much more widely used by cable companies; therefore, in what follows, almost exclusive attention will be paid to the former type of contract.

The outstanding feature of a leaseback contract is that in order to gain access to telephone company poles and rights-of-way, the cable companies must contract with Bell to construct the cable system, pay for the labour and materials used in the construction and then lease the system back from the telephone company since ownership of the cables resides with the telephone companies. Under the complete system agreement, all cable and equipment used in the distribution system remains under Bell ownership even after the CATV firms have paid for it.[75]

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[75]Other features of the "complete system agreement" include the following:

(1) the distribution system is to be unidirectional only;
(2) channel space is leased from Bell on a per channel basis. The rates include a monthly charge of $65.00 for the first channel and $42.50 for each successive channel up to 19 channels. A monthly charge of $17.25 per quarter mile of cable when the system carries 8 regular TV and 4 FM stations is also imposed; extra television channels increase that rate by $1.25 each, while FM stations cost an additional $0.25 each;
(3) the head-end, antennae, and housings for equipment

Under the partial system agreement, some of the equipment used in the distribution system is owned by the cable operator; however, all of the coaxial cable remains the property of Bell (with the exception of house drop cable). Bell refuses to allow cable owned by CATV companies on its poles.[76]

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remain the property of the cable operator. Bell constructs and instals the entire system. Initial subscriber connections are made by Bell, while disconnects and reconnects are to be made by the cable operator;

(4) a performance bond, in an amount to be determined by Bell, is required to guarantee payment of charges for the initial construction.

See Canadian Telephone and Cable Television Journal, December, 1968--January, 1969, p. 22.

[76]This policy was admitted to by Bell in a CRTC Public Hearing:

MR. GOLDBERG (counsel for CRTC): Now I would like it if I could get from you, please, gentlemen, a definite answer to the question of leasing of poles. What is your policy about two cable operators who have their own cable or who are in a position to supply their own cable and who do not need your footage but only require your pole use? What is your general policy?

MR. BAYS (General Marketing Manager, Bell Canada): Our policy, Mr. Goldberg, is that we do not accept pole attachment privileges at this time.

MR. GOLDBERG: So that if a company which met the criteria of having a licence and having Letters Patent and being financially substantial, still if it wanted to put its own cable you would refuse to accept such an arrangement?

MR. BAYS: That is correct.

MR. GOLDBERG: And have done so?

MR. BAYS: That is correct.

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MR. LEIGH-SMITH (Assistant Vice-President, Bell Canada): Mr. Chairman, I think perhaps the question that does arise out of this is why.

MR. JUNEAU (Chairman, CRTC): We would be interested to know, Mr. Leigh-Smith.

MR. LEIGH-SMITH: Why should Bell refuse to undertake a system arranging for a pole attachment? I think the answer to this arises out of the statements I attempted to make as an introduction today in that we feel the attachments of other

Under Article III of a Contract For A Partial Cable Distribution System To Provide Cable Television And/Or Pay T.V. Service between Bell Canada and Terra Communications, dated July, 1970, it is stated:

> Bell shall furnish, install, establish and construct for use by the Customer [Terra] the Bell facilities described in the Plan or Plans attached to Exhibit I from time to time or as described elsewhere in this contract. Bell will also install Customer owned facilities as herein after set out.[77]

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owned plant on company and joint use poles is not consistent in the long term with the development of a coaxial cable distribution network, that having a large number of different employee bodies with different background, different training, say creating perhaps work hazards, having access to the same poles would provide for complete chaos in the distribution industry within a few years. We feel that the integrated design and the full responsibility of the common carrier for the maintenance of the cable plant and for its efficient functioning is a central point and this basically is why we have refused to enter into contracts which we did not feel lend themselves in the long run to evolve into a coaxial cable distribution network type of arrangement with all users.

MR. JUNEAU: You had some final remarks, Mr. Leigh-Smith?

MR. LEIGH-SMITH: Yes, sir, in closing I would simply like to re-emphasize that the prime function of Bell Canada is as a common carrier and that is to provide the electronic highways for the transmission of the full spectrum of communications signals. Common carriers by definition are required to make their services available on fair and reasonable terms to all who desire them. This concept provides the necessary protection for the small user while permitting full service to the big user.... From Transcript of CRTC Public Hearings, Volume 4, March 1969, available in CRTC Library, Ottawa, pp. 118-120.

[77] In Exhibit 2 of the same contract it is stated "Bell facilities will be installed in all places where Bell normally may place or install its telecommunication plant, provided the applicable consent of all other owners and authorities can be obtained." In Exhibit 3 it is stated "Coaxial cables mutually agreeable to Bell and Customer shall be furnished by Bell. Other test equipment and/or methods may be suggested by either party for substitution or alteration of the herein set out procedure. Bell will consider any such change and, if approved, so indicate in writing."

> Under this contract Bell will only install service drops when they can be buried by Bell at the same time and in the same trench as Bell buries other telecommunications facilities. In this situation, Bell grants ownership of the drops to Customer.

It is possible, then, since Bell demands the right to construct the cable system itself and supply the cable that it may unduly take advantage of its monopolistic position and overcharge cable companies for these services. Exhibit 4 of the Contract sets out the instalation charges demanded, and these charges vary according to the type of cable used. Table III-5 lists the rates charged.

Table III-5. Construction Costs per Mile for Various Types of Cable

Type of Cable	Installation Charge per 100 Feet
NEAL 750	$50.00
CAX 750 (AL 3475)	62.50
NEAL 500	43.50
NEAL 412	37.00

Source: Bell contract, op. cit.

The one time instalation charges shown in Table III-5 cover cable instaled aerially, in ducts, or buried and such charges "include use of Bell poles, and ducts that exist at the start of construction of any given plan, provided that, based on recognized utility engineering standards, said

structures have the capacity to bear coaxial cable." If such capacity does not exist, the customer must reimburse Bell for the extra costs involved, and the customer is billed at "supplementary work prices" (prices based upon "full economic costs incurred by Bell"). At the rates listed in Table III-5, then, Bell charges between $2000 and $3000 a mile for supplying and instaling cable, assuming no supplementary work is needed. In addition, the cable companies must face the cost of supplying the electronic equipment (mainly amplifiers) which will raise the per mile cost significantly.

In order to assess the reasonableness of the rates charged, the Bell per mile rate for supplying and instaling cable of type AL 3475 (assuming no supplementary work) is compared with the per mile rates charged by Noram, a private CATV engineering and construction firm, for instaling the same cable. The prices in each case are for the erection of strand and cable plant and the prices include all associated pole hardware and the instalation of amplifier housings (without the amplifiers) and passive devices. The Bell rate works out to $3310 per mile compared to $3362.36[78] per mile charged by Noram. The rates charged are so similar that one might at first believe that Bell charges are quite reasonable. One should not lose sight of the fact, however, that under the Noram system the customer owns the cable while under the

[78]Noram construction cost estimates, Feb. 18, 1970.

Bell system Bell retains ownership and continues to charge cable rental fees. This latter point will be discussed in more detail momentarily.

On the evidence presented above, however, it appears that Bell is charging rates which would seem to be "competitive" in the sense that Bell has not inflated its construction costs. To further test this hypothesis, Table III-6 shows comparative cost estimates for the construction of a cable television system in Calgary. By comparing the construction bids solicited from six applicants, it is possible to compare the relative efficiency of the telephone companies.

Table III-6. Comparative Estimated Costs of Construction of a CATV System in Calgary

Contractor	Capital Expenditure	Telephone Co. 10-Year Rent	Total Capital Expenditure + 10-Year Rent
Manitoba Telephone	$6,555,380	$3,079,296	$9,634,676
Alberta Gov't Tel.	nil	13,528,930	13,528,930
Bell Telephone	6,568,227	1,334,556	7,902,783
Edmonton Telephone	nil	25,595,117	25,595,117
Subcontracted	6,703,636	958,500	7,762,136
Calgary Videon	5,828,308	958,500	6,786,808

Source: confidential

The Calgary system in Table III-6 is 900 miles long, with 72 miles underground and 110 miles of trunk cable. The system passes 105,000 dwelling units.

As would be expected, the lowest total cost can be obtained when Calgary Videon undertakes the construction itself, and the next lowest cost may be obtained by subcontracting out the construction. The lowest of the telephone company bids comes from Bell Canada, their price being $1,116,000 higher than if Calgary Videon did its own construction and $140,000 higher than the cost of subcontracting the work. Almost two million dollars higher than Bell's is the bid by the Manitoba Telephone System. The price estimated by Alberta Government Telephones is twice the lowest cost estimate and that of 'edmonton telephones' is almost four times the low cost estimate, being almost $20 million dollars higher.

While Table III-6 may place Bell Canada in a relatively favourable light vis à vis the other telephone companies, it does little to alleviate the concern that cable operators may experience when they are forced to accept the price dictated by a telephone company in order to gain access to the poles. Generally, there is no opportunity to solicit competitive bids in order to drive down construction costs.

One further piece of datum is now brought forward to help develop an intuitive feel of the extent of possible telephone company exploitations. The data described stem again from a case of government sponsored monopoly and exploitation by Bell of this position. In July of 1969, the Department of Communications announced a semi-freeze on the licensing of new private microwave systems in an attempt to

avoid situations in which a number of private systems ran parallel to the common carrier systems that could also supply the service. It was felt that a growing proliferation of the private systems might lead to difficulties in planning a low cost, over-all communications system. The DOC policy became one in which the applicant for private microwave had to "present strong and persuasive arguments justifying their needs," which contrasted with the former policy of granting licences to all who satisfied the technical considerations.[79]

The Department of Communications' policy on licensing private microwave is contained in Radio Standards Procedure 113.[80] Applicants for private microwave must submit both a Letter of Intent (which is a plan to co-ordinate the planned system with those of users of existing or planned systems in the same environment in order to avoid interference) and an Economic/Commercial Brief, both as the first phase of the application. The purpose of the Economic-Commercial Brief is to establish that the public interest lies in the creation of a new facility and that the existing facilities are

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[79] Financial Post, July 26, 1969.

[80] Department of Communications. Radio Standards Procedure 113. Application Procedures for Planned Radio Stations Above 1.7 GHz. (Mimeo) Effective date Nov. 1, 1970. The Procedure is said to reflect the responsibilities of the Minister of Communications in (a) providing for the planning of the efficient and orderly growth of Canadian telecommunications, (b) protecting the public interest in the use of spectrum, (c) resolving interference problems, (d) reconciling radio use in Canada within the framework of International Agreements, and (e) considering future system expansion plans.

insufficient to meet this interest and need. To quote Procedure 113,

> The telecommunication carriers are responsible for a significant percentage of the applications for radio relay facilities. In view of this fact, and the particular information requirements associated with this category of applicants, this procedure distinguishes between the economic and commercial information required from the carrier and the information which should be supplied by applicants who are applying for systems to meet their own private telecommunication requirements.[81]

To be included in the Economic/Commercial Brief are, among others, the following:

> (i) the reasons for the planned construction and/or system changes [item (b)],
>
> (ii) an identification of available alternatives with respect to obtaining facilities on a leased basis from other carriers and an indication why these alternatives were rejected [item (f)],
>
> (iii) an identification of any traffic that will be transferred from facilities that are presently leased from another carrier [item (g)],
>
> (iv) a precise definition of the reasons why the required service is not being obtained from the telecommunication carrier. The applicant should identify his particular objectives and explain how the proposed system will meet these objectives better than a carrier system [item (l)].[82]

From the above, then, it may be concluded that the established carriers have an advantaged position in supplying microwave facilities over those who desire a licence for a private system, and it is possible the carriers may unduly exploit this advantage. This situation is similar to that

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[81] Ibid., p. 7.

[82] Ibid., Appendix IV.

facing the cable companies in their efforts to secure pole attachment rights in that governmental policy has helped enforce a degree of monopoly in the provision of the service.

Comparative costs faced by a private broadcaster, Ottawa-Cornwall Broadcasting Limited, through leasing microwave facilities from Bell Canada and constructing a private microwave system as given below are derived from the Economic/Commercial Brief in Support of an Application by Ottawa-Cornwall Broadcasting Limited for an Extension to Its Intercity Television Microwave Relay to Serve a Proposed New Television Broadcasting Station to be Located Near Deseronto, Ontario, dated July 6, 1971. The proposed system would be made up of microwave loops at Camp Fortune, Quebec, Lavant Mountain, Horseshoe Lake and Deseronto, Ontario, the system to be for the exclusive use of Ottawa-Cornwall Ltd. Table III-7 shows the estimated annual costs of the two systems for both a five year depreciation period (and 5 year lease contract from Bell) and a ten year depreciation period (and a ten year Bell lease agreement) based on a capital construction cost of $140,140.

While there were said to be several other advantages to the privately-owned system, e.g., superior video quality than could be obtained over the Bell system, the cost savings from avoiding the common carrier system amount to over 100% each year. Table III-7 hints that Bell, when given a certain degree of governmental protection, may on occasion exploit its favoured position. Other complaints against Bell service have

Table III-7. Cost Comparison, Private vs. Common Carrier Microwave System, Camp Fortune to Deseronto, July, 1972

	5-Year Basis	10-Year Basis
Privately Owned System		
Discounted capital cost per yr.	$35,400	$21,900
Annual operating costs	9,200	9,200
Total annual cost	$44,600	$31,100
Leased Common Carrier Facilities		
Annual lease costs, quoted from Bell	$95,400	$89,000
Cost Saving Before Taxes of Private System Per Year	$50,800	$57,900

Source: Economic/Commercial Brief from Ottawa-Cornwall Broadcasting Ltd., July 1971.

been documented by the CAB.[83] The discussion now returns directly to the relations between CATV companies and Bell Canada.

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[83]Canadian Association of Broadcasters. "Analysis of the Relationship Between the Functions of Common Carriers and Broadcaster," Submission to Telecommission Study 1(d), March 1970, especially Appendix B.

One further example of unrealistic charges imposed by common carriers may be given quickly by quoting from a letter from IWC Industries Ltd. to Frank K. Foster, Secretary, Canadian Radio-Television Commission, dated September 2, 1969 in response to a CRTC request for comments on the use of microwave by CATV The letter states in part:

> A case study based on Kamloops also illustrates our experience from the point of view of the economics

Even after paying for the cable system, CATV operators are forced to pay a monthly rental charge for the cable to the telephone companies. Exhibit 4 of the Contract between Bell Canada and Terra Communications Ltd. gives the monthly rental charge for each 100 feet of cable of all types as $0.26, and this is equivalent to a rental of $164.74 per mile per year.

A legitimate rental charge that could be imposed by Bell upon the CATV companies would be for the use of the poles. Since the cable companies have fully paid for the cable themselves (even though they do not retain ownership of it), it would be a questionable practice to charge rental for the cable. However, pole rental may be a legitimate charge. By placing the $0.26/100 feet/month rate on a per pole basis, it is possible to assess the reasonableness of this charge.

An CATV construction engineer estimated that it is reasonable to assume that there are 100 poles per mile, and so the annual pole rental at this rate is $1.65. He also estimated that the instaled cost of a 50 foot pole is roughly

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of microwave. The CN Telecommunications letter outlines their estimate of cost for Kamloops, $396,000 for three channels on a five year contract. An alternative to the lease arrangement is the building of a private microwave system. This alternative has been studied and estimated by Acres Intertel Limited to approximately $365,000. In short, one year's lease costs exceed the total capital cost of a private system designed for this route and optimized to this service. (Letter signed by G. D. Zimmerman, President, IWC Industries, Limited.)

$120.00,[84] and that the expected pole life is 20 to 40 years. A straight-line depreciation of the pole would give an annual depreciation charge of $3.00 to $6.00. Since Bell Canada is not charging the cable companies for the full amortisation of the pole, its rates may be said to be "reasonable." For further comparison, Hydro generally charges $2.00 to $6.00 per year per pole when cable companies rent space from them.

There are two broad reasons why CATV operators object to lease-back contracts. In the first place, after investing a considerable amount of capital in the construction of the cable television system (often at rates considerably higher than the cost to be faced were they able to construct their own system), the cable operator's capital investment is represented by a Bell Partial System Agreement rather than the assets of the cable system itself. Cable people claim that this presents difficulties in raising capital.

In the second place, since the telephone companies own the cable, they are in a position to dictate what shall and what shall not go over the cable in the form of messages. So now attention is turned from the possibility of economic exploitation through unreasonable charges to a second broad area of friction between the carriers and the cable companies, that involving undue restriction on the types of services that may be provided by CATV.

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[84]The cost of a 25 foot pole to be devoted exclusively for CATV purposes has been estimated at about $35. Verne Ray. CATV Operators Handbook (Thurmont, Maryland: Tab Books), 1967, p. 64.

Article 4 of the Contract between Bell and Terra Communications states in part:

> The Customer covenents to use the Bell facilities only for the distribution of signals conveying television and/or radio programs. Such signals may be disseminated to the complete network, a limited network or on a point-to-point basis. Nothing in this contract shall be construed as permitting the transmission of data which is not part of or ancillary to a broadcast or cablecast, radio or television program. The signals conveying television and/or radio programs may flow either direction on the Bell facilities provided only that the Customer shall not utilize the two-way capability of the cable for any inquiry response type of communication. Customer shall not use in conjunction with or connect to the Bell facilities any device capable of performing automatic or manual exchange of switching.

And in Article VI, item (i), is contained the following restriction:

> Bell shall refuse to interconnect its cable facilities with the non-Bell-owned CCD [coaxial cable distribution] System facilities, in those instances where the non-Bell-owned CCD System facilities either in whole or in part, have been installed in such a way as to be capable of replacing cable facilities provided by Bell to the Customer....

While cable systems under these sections of the Bell contract are limited entirely to the traditional role of distributing broadcast programmes and while such restrictions severely limit the progress cable systems can make toward developing the wired city, the restrictions are actually a good deal less confining than those formerly employed by the Company, and than those still employed by most of the other large telephone systems in Canada. For example, contained in a 1970 Coaxial Cable Distribution System Agreement between Maritime Telegraph and Telephone Company Limited and Halifax Cablevision Limited is the following:

> Whereas the Customer [Halifax Cablevision] ... has requested the Company [MT&T] to furnish cable facilities in the area described ... as required by the Customer initially and from time to time, as hereinafter described, for use by the Customer in conjunction with Customer's equipment for the distribution to the Customer's subscribers of television and FM radio signals for CATV purposes, but excluding industrial, commercial, educational and other similar television service offerings which may normally be distributed on a limited network or point-to-point basis....[85]

And in Article V of the Contract are contained the following restrictions:

> The Company shall be and remain absolute owner of Company Facilities furnished by it hereunder for use by the Customer.
>
> The Company shall have the right to determine the TV and FM channel frequency assignments to be used by the Customer.... The Company reserves the right to make use of or permit others to make use of any unused channel or space in the frequency spectrum in the Company Facilities furnished by it under this contract ... provided that the quality, grade or frequency assignment of the CATV signals not be impaired.[86]

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[85] Limited Network Service involves the "transmission of signals from one location and made available to fewer locations than the total number of subscriber locations connected to the Company Facilities." Point-to-point service involves the "transmission of signals via the Company Facilities from one location to one other location." (MTT Contract, p. 4.)

[86] Having now discovered that MTT's attitude toward CATV is much more restrictive than even Bell Canada's, it may be useful to return to the CRTC Hearings, this time when representatives of MTT were testifying:

MR. THERRIEN (Commissioner): Mr. Unsworth, page four of your brief you mention that most CATV systems depend on telephone company poles and plant and if Maritime's application is approved, that action will result in an effort to deny the licences to other interested parties and the grant of an exclusive right in Nova Scotia. Does that mean if you were granted a licence in a certain part of Nova Scotia, you would refuse access to the poles in the remaining area?

MR. UNSWORTH (Secretary and General Counsel, MTT): Yes.

MR. THERRIEN: And how does this compare with the definition of common carrier included in the Federal Act?

MR. UNSWORTH: Well, I don't honestly know, Mr. Commissioner. The definition of common carrier, well that is not

An Agreement and Lease dated May 11, 1970 between Maritime Telegraph and Telephone Company and Metrovision Limited regarding the cities of Dartmouth and Halifax, Nova Scotia contain the following restrictions:

> Part 4--Provision of Plant and Lease of the Same. 4.02. Maritime agrees to lease and does hereby lease to Metrovision for the term hereof, for the purpose only of the reception and transmission of television and radio signals for CATV purposes only:
>
> (a) the distant head-end
> (b) the local head-end and
> (c) the studio and mobile equipment and in common with Maritime and any other person or persons lawfully using the same under the authority of Maritime.
> (d) the tower and appurtenances thereto used for the support of the distant head-end,
> (e) the plant forming part of the microwave transmission system from Digby as aforesaid,
> (f) the plant and coaxial cable, if any, between the microwave transmission system and Metrovision's studio and/or the distribution system,
> (g) the trunk and feeder coaxial cables, amplifiers, lead-ins and customer or subscriber connections, all of which items are herein sometimes referred to as the "rental property."
>
> Part 6--Control of Various Plant, Equipment and Program. 6.01. The distant head-end (Digby) and the local head-end shall be and remain the property of Maritime but such shall be within the exclusive control, direction and use of Metrovision, subject to other CATV licensees having the benefit of the distant head-end

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defined in any regulation which governs Maritime Telegraph and Telephone Company. It may be defined in one of the Federal Acts but if so, I am not aware of it. What we have in mind is building a system so if we do receive a licence to operate in Halifax, we would be back again applying for licences in a number of other towns and villages.... Canadian Radio-Television Commission. Transcript of Public Hearings, Volume I, November, 1968. (Available in the CRTC Library.) pp. 117-8. Happily, the CRTC did not grant the licence application and Maritime Tel. was not back again.

through the microwave system as indicated in paragraph 4.03(d) hereof and subject to approval of the Commission.

6.02. The establishment and operation of Metrovision's studios shall be the sole responsibility of Metrovision. All of the studio and mobile equipment, including cameras, projectors, tapes and vehicles shall be and remain the property of Maritime but during the term hereby (and any renewal or renewals) such shall be within the exclusive control, direction and use of Metrovision.

6.03. The coaxial cable (trunk and feeders) cable amplifiers, lead-ins (house drops) and customer or subscriber connections shall be and remain the property and with the exclusive control of Maritime.

6.04. Metrovision shall have and maintain exclusive control (subject to proper direction and supervision by the Commission) over all program content and Maritime shall not control or direct or influence in any way, directly or indirectly, any program content of Metrovision's CATV transmissions.

6.05. Metrovision shall not, during the term hereof or any renewal, become involved or engaged, directly or indirectly, in Nova Scotia or Prince Edward Island in telecommunications or coaxial transmission other than CATV services (which services shall not include switched or point to point or closed circuit or private channel transmissions).

Part 8--Liability and Indemnity.

8.02. Maritime shall make all reasonable efforts to supply, install and erect the rental property as soon as possible after this agreement and lease come into effect and to maintain the same in good working order but all subject to its reasonable financial arrangements, availability of materials and availability and scheduling of staff. Maritime shall not be responsible for or have any liability to Metrovision or the customers of Metrovision or to anyone else because of delays in supply, installation, construction or maintenance or because of interruption of, breakdown in or weakening of signals or transmission in or through the microwave system, the studio, mobile, plant and equipment, the coaxial cable, the amplifiers or any part of the rental property.

Part 9--Notices, Assignments and Miscellaneous.

9.05. ... Maritime reserves the right and privilege of using for any and all lawful purposes (telecommunication or otherwise) either personally or by renting or otherwise granting use of the same to others of any and all channels or circuits on or forming part of the microwave system, the coaxial cable (trunk and feeder) the

amplifiers, the house drops, and the customer or subscriber connections.[87]

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[87]The philosophy behind this contract is stated clearly in a memorandum entitled "Intervention by Maritime Telegraph and Telephone Company Limited," signed by W. S. Robertson, Vice-President, Operations, MT&T and filed with the Secretariat of the CRTC June 4, 1970. This memorandum states in part: "Maritime, as a substantial common carrier in Nova Scotia, is vitally interested in all aspects of telecommunications and in particular is engaged in the business of communications by microwave and by coaxial cable.

"Maritime believes that its experience, stability, existing facilities and trained staff make it particularly suited in Nova Scotia to be employed in the common carrier aspect of communications and, as indicated, it is already heavily involved in these ventures.

"Maritime, through its subsidiary cablevision services (N.S.) limited (sic.), made application to the Commission some time ago for a CATV license. This application was submitted at a time when catv (sic.) operations appeared to be substantially those of transmission with limited emphasis on programming.

"Maritime sees itself as a common carrier and not as a producer of programmes. Maritime has caused its subsidiary to withdraw its application for a broadcasting license.

"Maritime is of the view that the collection and distribution of signals should be carried out by a common carrier and such functions of a CATV system which involve broadcasting (Programming, etc.) should be carried out by a licensed CATV broadcaster.

"It is the view of Maritime that the licensed broadcaster should not be involved in closed circuit or point-to-point or switched transmissions but that such broadcaster should be involved in the transmission of off-air and local programmes. If licensees installed their own systems of cable and otherwise, they would not have the advantage of the extensive existing facilities of Maritime and in addition the unused portion of the spectrum in their cables would not be readily available to a common carrier for other telecommunication purposes. The result would be unnecessary and expensive duplication of facilities....

"As a common carrier, Maritime has developed in detail, for the Halifax-Dartmouth Metropolitan area, a proposal for a 27 channel (in the urban area) system, modern in planning and design. The system is a coaxial cable distribution network so-called and not a CATV system only. The system would make use of the existing central office facilities of Maritime....

"It is respectfully submitted that the proposal by Maritime would result in the provision of CATV service to more

Were the CRTC to have granted a licence to Metrovision, the latter being subject to the terms and conditions as given above in their contract with MT&T, the CRTC would have effectively abdicated all control over cable television in Nova Scotia to Maritime Tel. Under this contract, Maritime would have complete authority in the purchase and selection of equipment, the timing of construction, and complete control over the quality of signals, and control over these matters would be beyond the jurisdiction of the CRTC since MT&T would not be the licence holder.

Presumably, the Commission would retain some control over rates, choice of channels and local programming on the cable system. The cable company itself would be left with no assets under its ownership except the contract. It will be recalled by referring to footnote 86 of this chapter that Maritime had applied for a CATV licence in this area, which had been denied them. What approval of the Metrovision application would have accomplished in comparison to approval of MT&T's own application would have simply been to remove to arm's length the MT&T from the local cablecasting function. In every other matter, MT&T's powers over CATV would remain

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areas than would otherwise be economically possible...; it would avoid expensive duplication of facilities--both microwave and local coaxial systems; it will integrate with existing telecommunication services; it will provide for the establishment and expansion of Educational Television all of which will be in the best interest of the residents of Nova Scotia." (Italics mine. Cf. statement by Mr. Unsworth on page 169, footnote 86).

as great as if they were granted the licence themselves. In fact, their powers over CATV under the proposed contract may be said to be even greater, since MT&T itself would not be responsible to the CRTC since it would not be the licence holder. MT&T would have assumed complete regulatory authority over CATV and been able to share in the profits at the same time.

In what must be considered one of the most important decisions made by the CRTC, the Metrovision application was denied (CRTC 70-190 and CRTC 70-191, July 27, 1970). In approving the applications by two other companies to serve the Halifax-Dartmouth area, the Commission said:

> Approval of these two applications is conditional upon the CATV licensees having effective ownership and control of the local head-end, amplifier and associated equipment.... The Commission proposes to discuss ownership and control of the distant head-end with each party.[88]

As a result of the CRTC decision, MT&T entered into the contract agreement described above with Halifax Cablevision, the agreement still remaining highly restrictive.[89]

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[88]Canadian Radio-Television Commission. Public Announcement. July 27, 1970. Decision CRTC 70-191.

[89]It may be interesting to peek at the financial arrangements agreed to by MTT and Metrovision to further see the control exercised by MTT in the abortive contract. See especially item (d) below.

Part 5--Determination of and Payment of Rental Compensation.

5.01. The rental compensation payable by Metrovision to Maritime for the use and rental of the rental property (which compensation Metrovision hereby covenants and promises to

As a final example of the restrictions contained in telephone company contracts with cable companies, having the effect of limiting the fields such companies may enter, selected clauses of a Coaxial Cable Distribution Agreement between the Manitoba Telephone System and Metro Videon Limited, dated May 31, 1967 are given below. An edited version of this contract is given in Appendix C.

> [The Telephone System shall supply certain equipment to be used in conjunction with the Customer's own equipment for the purpose of distributing] broadcast television program material or frequency modulation radio program material, broadcast openly for free public reception from a licensed broadcast television or radio station received directly off-the-air or indirectly by microwave relay (where permitted by the Department of Transport and the Board of Broadcast Governors) by the Customer's equipment, or injected in to the distribution system by direct connection (where permitted by the Department of Transport and the Board of Broadcast Governors) from standard television or radio broadcast stations, to standard television or radio receiving sets

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pay without any deduction whatsoever therefrom) shall be computed and paid as follows:

(a) Metrovision shall pay and compensate Maritime for the full cost of all operating expenses (such as repairs and maintenance including depreciation) provided by Maritime for or respecting the rental property.

(b) Metrovision shall pay Maritime a sum of money equal to 15 per cent annually of the gross average cost to Maritime of the rental property (capital cost of all plant and equipment).

(c) Metrovision shall pay Maritime a sum of money equal to 10 per cent per annum of the amount of the working capital advanced in money by Maritime to Metrovision and unpaid from time to time together with 10 per cent per annum of the amount of money which may be advanced by Maritime (and unpaid from time to time) to make up any deficits of Metrovision.

(d) The income before income taxes of Metrovision (being the balance of income available after the deduction of operating and maintenance expenses and depreciation and after deducting the payments due and payable to Maritime ... but before deducting income taxes) shall be divided between Metrovision and Maritime and paid on the basis of 20 per cent and eighty per cent respectively.

> of all the customers (sic) patrons. The Customer may not authorize any other persons to use this service. Coding of signals or segregation of channels or programming material being transmitted to patrons of the Customer by any means that would not allow all of the Customers (sic) patrons to receive all of the material being transmitted with standard television or radio receivers is not permitted. Additional channels may not be created from channels provided to the Customer for use of the CATV system....
>
> The Customer shall have the right for the purposes set out in this Agreement to make use of the following channels or space in the frequency spectrum contained in the cable facilities furnished by the Telephone System under this contract;
>
> (a) VHF channels contained in the 54-88 megahertz wave band for television channels 2-6 inclusive;
>
> (b) VHF radio channels from 88-108 megahertz for broadcasting FM radio programs;
>
> (c) VHF channels contained in the 174-216 megahertz wave band for television channels 7-13 inclusive.
>
> The Telephone System shall have the right to use the remaining channels or spaces in the frequency spectrum in the said cable as well as UHF channels 14-83 inclusive over the frequency range 470-890 megahertz, inclusive and for that purpose, enter the said cable, provided however, that the Telephone System will not use or allow any other person to use any of the said channels reserved to itself for the purposes of competing with the entertainment channels to be used by the Customer....
>
> It is mutually agreed between the parties hereto that the use of the channels in the said frequency spectrum in the said cable hereby allocated to the Customer shall be used for entertainment purposes only unless the Telephone System, in writing, grants to the Customer permission to use the said channels for any other purposes and, without restricting the generality of the foregoing, the Customer shall not use its part of the cable facilities for industrial, commercial or educational television or other similar television service offerings which may usually be distributed on a limited network or point to point basis.

Similar restrictions are contained in contracts drawn up by Alberta Government Telephones. Presumably (although I have not had an opportunity to read such contracts), the same is

true for Saskatchewan Telecommunications, Newfoundland Telephone Company and New Brunswick Telephone Company, the remaining members of the Trans-Canada Telephone System.[90]

What are the effects of the restrictions documented above upon the range of services offered by cable television companies? Every contract discussed prohibits CATV companies from engaging in activities unassociated with television and radio signal delivery. The Department of Communications has broadly grouped services that would be offered in a "total telecommunications system":

> (a) broadcast services, including commercial and instructional television, commercial and instructional radio,
>
> (b) real time point to point services, including telephone, videophone, telegraph, and teletype, certain computer services,
>
> (c) store and forward services, including computer services (time sharing and instruction), facsimile (newsprint and magazines, library access), financial transactions (banking and remote purchasing), interrogating (polling and meter reading), and mail delivery.[91]

The telephone contracts in every case have forbidden the CATV companies from engaging in either real time point to point services or store and forward services. Often, the telephone companies have reserved the right to use unused

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[90]The British Columbia Telephone Company is the only major telephone system to grant pole attachment rights. See Canadian Cable Television Association, Submission to Telecommission Study 1(d), April 1970, p. 21.

[91]Department of Communications. "Multiservice Telecommunication Systems--The Wired City," Telecommission Study 8(d) (Ottawa: Information Canada), 1970, pp. 57-8.

spectrum on the cable with the possibility that at some future date they themselves might offer some of the services forbidden to cable companies that are not presently being offered by anyone. However, under the partial system agreements, which are the most common type of agreement, the amplifiers used for one way CATV are not suitable for these other services. If the telephone companies were prepared to offer any presently unavailable services on the coaxial cable, they would find it necessary not only to instal new expensive electronic equipment, but to compensate the cable operators for the equipment owned by them (such as amplifiers). This would raise serious problems as to who owns the new multi-service electronic equipment, since the CRTC appears to favour the partial system agreement. Under the current set-up, then, it seems that the unused spectrum on coaxial cable, which is capable of providing so many new services, will continue to be wasted through idleness. There are two ways of approaching this standoff. One method would be to follow the plan of Maritime Telephone and Telegraph Company, whereby the telephone companies are the sole owners of the broadband distribution network and are responsible for ensuring the compatibility of all equipment for present and future services. In such a case, spectrum would be leased to independent CATV companies for the provision of cable television service, or possibly the provision of CATV service would be undertaken by the telephone companies themselves.

As a second possibility, the telephone companies could be removed from cable television entirely by requiring the telephone companies to provide reasonable pole attachment rights and by forbidding them to own coaxial cable used for CATV purposes. Each of these general methods of solving the problem at hand will be treated in the last section of this chapter. For now it is sufficient to state that under the current regulatory framework neither approach is possible and the wired city will never come about until such time as the regulation of telephone and cable is co-ordinated.

Restrictions imposed by the communications common carriers on cable television systems do not even lead to effective use of television and radio signals. Telephone companies other than Bell Canada have forbidden "limited network" and "point-to-point" communications[92] often specifically

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[92]It is interesting to note that at a time when the telephone companies are preventing such closed circuit operations, regulatory authorities in other jurisdictions are requiring this capability.

"For the purpose of permitting the simultaneous transmission into any one or more subdistricts of isolated, discreet signals ... the Company shall within four (4) years from the effective date of this contract have arranged the System so that it is capable of such transmission to no less than ten (10) subdistricts, each containing approximately the same number of dwelling units. Furthermore, the Company shall immediately undertake the development of a plan to divide the District into the greatest number of subdistricts as possible, which subdistricts may be variously combined so as to constitute neighborhood communities, school districts, Congressional districts, State Senate and Assembly districts, and the like, for the simultaneous transmission into any one or more of such subdistricts of such isolated, discreet signals.... It is the intention of the parties under this subdivision that the

confining programmes to the "entertainment" genre or specifically barring any "industrial commercial and educational" use of cable networks. Restrictions of the sort that prevent the use of cable television for any limited network service have the same effect, since these restrictions disable CATV from offering closed circuit programming to schools and universities, for example. Even the Bell contract, which may be considered to be the least restrictive of the group of contracts, prevents full use of cable television for educational purposes since "the Customer shall not utilize the two-way capability of the cable for any inquiry response type of communication." The ability of cable to allow students to reply to questions raised in televised lectures is thus voided.

To the depressing list of restraints imposed by the telephone companies could be added a third broad classification--restraints that have the effect of raising uncertainty for the cable operator. A complete discussion would deal with at least the following points:

(i) the cable operator has no assurance he will be allowed to remain in business after the expiry date of his lease agreement,

(ii) while the cable operator enters into a ten year lease agreement with the telephone companies, the equipment has a warranty for one year only,

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System be capable of simultaneous delivery of different programming to each subdistrict at the same dial locations." From The Municipal Franchise by the New York City Board of Estimate, as quoted in William Jones, op. cit., p. 152.

(iii) service may be disrupted over Bell facilities for up to twenty-four hours due to no fault of the cable operator without any compensation. For a continuous disruption over 24 hours, the cable company is allowed a credit in his monthly charges proportioned to that period of time. Such credit bears no relation to the ill-will generated by the disruption among subscribers or possible revenue loss due to disconnects,

(iv) Bell may capriciously revise rates charged cable companies throughout the contract life,[93]

(v) the cable operator may only discontinue the use of 10% of the Bell facilities for the life of the contract, in spite of the fact he has paid for the facilities himself. The operator must pay Bell for the removal of the facilities.

This completes the discussion of the contractual relations between the cable television companies and the telephone companies. The reader may wish to study the Manitoba Telephone contract printed as Appendix C to this chapter in order to list other restrictive clauses not dealt with here. We turn now to the public policy implications of the state of affairs described above.

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[93]Specifically: "During the term of this contract and any extensions thereof, Bell may revise the rates or charges referred to in Exhibit 4 at the times and in the manner set forth below:

(a) non-recurring installation charges, interest on deposits, multi-tap charges, drop installation charges and overdue account service charges may be revised on January 1 of every year, provided two years have elapsed from the earliest effective date of this contract,

(b) during the term of the contract and any extension thereof, monthly charges may be amended every third January 1 commencing on the fourth January 1 during the contract period,

(c) Bell will, as prices and economic conditions warrant, up-date its prices for Repair and Maintenance and its prices for Supplementary Work."

From Bell contract, op. cit.

V. Some Public Policy Issues

With some observers there has developed an increasing dissatisfaction with the age-old practice of granting monopolistic privilege to a private organisation which in return was to act as the chosen instrument of the state in its specific field of endeavour. As Dallas Smythe has said:

> Increasingly the technology has generated competitive pressures which have substituted the definition of markets (be they monopolistic as in the case of the switched network or competitive as in the case of the leased lines...) for reliance on the monopolistic industry-wide corporation with its nationwide averaging of costs and prices for all services. The AT&T and to lesser effect the smaller monopolistic common carriers have given ground slowly and reluctantly to the competitive pressures, with consequent opportunities unrealized which would otherwise have become a reality.[94]
>
> The satellite-computer revolution in technology made totally obsolete the previous notion that a one-to-one relation existed between the technology of telephone (or telegraph) and the monopoly corporation agent of the state in terms of market structure, or patents, or performance in the public interest.
>
> Industrial capability in most branches of telecommunications technology now exists in a wide range of major corporations, most of them outside the common carrier category in most branches of telecommunications technology ... [U.S.] Federal R. and D. funds, the space program ... and the computer have shattered the monopolistic corporation as the sufficient agent of national communications policy.... As Harry Trebing remarks, "Public policy could not re-establish the era of the monopoly firm even if it wished to do so."[95]

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[94] Dallas Smythe, op. cit., p. 25. See also Walter Adams and Joel Dirlam. "Market Structure, Regulation, and Dynamic Change" in Harry Trebing. Performance Under Regulation (East Lansing: Michigan State University Press), 1968.

[95] Ibid., pp. 5-7.

What has been the root cause behind such dissatisfaction with the single firm as the provider of all services of an industry? The dissatisfaction seems to stem primarily from rapid technological change and the demand for new services. The invention of the telephone necessitated the introduction of new plant and equipment quite unrelated to any existing plant and equipment in regard to both the technology used and the services provided. And so it seemed desirable to entrust the development of this new service and technology to a franchised monopoly so as to reduce risk and uncertainty and allow for planning on a large scale. The monopoly corporation assumed the responsibility for developing the terminal equipment to be connected with the system and so long as the only attachment remained the telephone there did not appear to be an overwhelming social cost in this monopolistic delegation of duties. The telephone companies had developed their system for telephone use and were fully competent in refining and improving the system for this use.

Upon realisation that the telephone distribution plant could be used for other services divorced from simple telephone use, the efficiency of maintaining the monopoly privilege over the switched communications system began to be challenged. An analogy to this situation could be a case in which the hydro companies would be given the unique responsibility of developing and marketing all electronic apparatus for all users that was to be plugged into the nation-wide system of electric

power wires. The ability of a single entity to meet the special needs and requirements of millions of individual customers would be severely limited; no single corporation could begin to meet a responsibility of this magnitude. Similarly, the exploding communications technological revolution means that the telephone common carriers may be inadequate to meet the task of providing all communications services. However, understanding of this situation has only recently taken place and only hesitantly been reflected in public policy measures.[96]

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[96]For example, the 1968 revision of the Bell Telephone Act added the following safeguards against the monopoly position of Bell:

5(4) For the protection of the subscribers of the Company and of the public, any equipment, apparatus, line, circuit or device not provided by the company shall only be attached to, connected or interconnected with, or used in connection with the facilities of the Company in conformity with such reasonable requirements as may be prescribed by the Company,

(5) The Canadian Transport Commission may determine, as questions of fact, whether or not any requirements prescribed by the Company under subsection (4) are reasonable and may disallow any contrary to the public interest and may require the company to substitute requirements to the Canadian Transport Commission in lieu thereof or prescribe other requirements in lieu of any requirements so disallowed,

(6) Any person who is affected by any requirements prescribed by the Company under subsection (4) of this section may apply to the Canadian Transport Commission to determine the reasonableness of such requirement having regard to the public interest and the effect such attachment, connection or inter-connection is likely to have on the cost and value of the service to the subscriber. From Statutes of Canada 16-17 Elizabeth II 1968, Chapter 48, An Act Respecting the Bell Telephone Company of Canada, p. 46.

As is general in the regulation of monopolies, the above provisions attempt to check specific abuses of monopolistic privilege rather than formulating positive policies of development of communications. It is incumbent upon the groups denied attachment rights to show the abuse, rather than for the telephone companies to justify the restriction.

As described in a previous section of this chapter, the reaction of the telephone companies to the rush of subscribers for the right to attach privately-owned equipment that provides services different from those traditionally provided by the telephone companies has been defensive and highly restrictive. The situation has been described as follows:

> Through microwave channels and the appearance of communications satellites there is no longer any technical need for distinction among the various forms of communication. All of them can pass through the same relays in the form of identical electronic pulses. This means that not only television and telephone, but books, magazines and newspapers will be converted into identical bits of energy for transmission over any distance. At the receiving end these electronic signals will be converted back into their original form or into any desired form; visual display, recorded sounds, processed pages, and so on. In other words, we will have one major channel of news, information and entertainment that will combine all or most of the separate electronic instruments and printed means of communications today.
>
> The effects of electronic communications on the publishing industry are already being seen in the mergers of publishing houses with electronics corporations (Random House with R.C A., General Electric with Time, Sylvannia with Readers Digest, Science Research Associates with I B M.)....
>
> In short summary, communication technology is now imposing unity upon all communication techniques. There is no longer any distinction among the various forms of communication. All of them can now pass through the same relays in the form of identical electronic pulses.
>
> Bell intends to be in the forefront of this development and to stand athwart the input and output of all transmitted data. This raises many questions, monopoly, privacy, even national security....
>
> A further practice of Bell which could spread into the entire telecommunications field if Bell's powers are extended has to do with Bell's practice of imposing "Bell standards" and excluding "foreign" equipment from physical contact with its own system.... Bell is the

> final arbiter in deciding what equipment will be used, how it will be installed and indeed by whom.[97] The impact of this policy already falls on a wide range of service companies and manufacturers dealing with paging systems, sound systems, mobile telephone, telegraphs, teletype and, in short, anyone with a direct involvement in service or equipment with Bell's communication network. More would be affected if Bell's activities spread further outside the telephone field.
>
> ... It is submitted that the foregoing indicates that Bell's powers should be carefully limited rather than extended to allow it to engage in the entire telecommunications field.[98]

It is possible, then to summarise the discussion to this point by stating that it may no longer be necessary to employ the monopoly corporation as the chosen instrument of communications development and in fact in order to attain more rapid developments in this field, the powers of the monopoly should perhaps be severely restricted. As has been previously seen, cable television offers one potential method of limiting the monopolistic powers of the telephone companies, as reflected in their foreign attachment and interconnection policies, by providing an alternative "electronic highway" onto which individuals may attach their terminal equipment. Such competition, in those fields for which the telephone system and and cable system are good substitutes, would limit the

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[97]See footnote 96, however. The Bell Canada Act was revised since this presentation.

[98]Industrial Wire and Cable Co. Limited. Brief Submitted to Standing Committee on Transport and Communications on an Act Respecting the Bell Telephone Company of Canada Bill C-104, printed in Standing Committee on Transport and Communications, House of Commons, 27th Parliament, 1967. Minutes of Proceedings and Evidence, October 31, 1967, pp. 150-152. Italics in original.

arbitrary power of Bell of refusing attachments onto the communications systems, in addition to any limits on this power as are forthcoming from the Canadian Transport Commission.

But it is not here (or even primarily here) that the potential of cable television systems lies. As has been seen, the present telephone system is inadequate for the provision of many of the services (including cable television service) that technology to-day makes feasible. The primary deficiency as has been stressed above is the available bandwidth.

It is clear that the potential that CATV offers is great. How much that will develop without positive governmental promotion is impossible to predict. But what does seem clear at this stage of cable television's development is that there should be as few restrictions as possible placed in the way of CATV's evolution. One of the primary blockages in this evolution is the contractual arrangements made with the telephone companies. It may be well to briefly summarise current public policy on these matters in the United States.

Under a 1956 consent decree, "The defendant AT&T is enjoined and restrained from engaging, either directly, or indirectly through its subsidiaries other than Western and Western's subsidiaries, in any business other than the furnishing of common carrier communications services ... [and] Western is enjoined and restrained from engaging either

directly or indirectly, in any business not of a character or type engaged in by Western or its subsidiaries for Companies of the Bell System [i.e., common carrier activities] ....[99] Since CATV has not been declared a common carrier, AT&T is prohibited from owning and/or operating CATV systems. However, other telephone systems in the United States are not so prohibited and it has been estimated that 146 or 5.8% of the cable systems in the United States are owned by telephone companies.[100]

In spite of the consent decree, the Bell System was able to control CATV companies through pole attachments in ways similar to the telephone company practices in Canada. In an effort to remove this power over cable companies held by the Bell System and other telephone systems, the telephone companies are now required to establish at the time they undertake construction of independent CATV systems "that the proposed CATV customer now has available the option of pole attachment or conduit space arrangements within the limitations of technical feasibility, at reasonable charges and without undue restrictions as to use, and that such customer still desires channel service from the applicant [the telephone company]."[101] Coupled with the pole attachment rights

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[99]United States District Coutt for the District of New Jersey, Civil Action No. 17-49, dated January 24, 1956, the Final Judgment reprinted in Standing Committee on Transport and Communications, op. cit., November 16, 1967, pp. 238-44.

[100]Jones, op. cit., p. 165.

[101]Federal Communications Commission Docket No. 18509, FCC 70-115. Memorandum Opinion and Order, released April 24, 1970, pp. 5 and 7.

is a prohibition against telephone company ownership of CATV systems in the service area of the telephone companies.[102]

What these two measures have done is to remove much of the control over CATV formerly exercised by the common carriers. However, to be effective, both measures must apply. The difference in the policies in the United States and in Canada in this matter arises from the fact that while telephone companies are prohibited from owning and operating CATV systems in Canada,[103] there is at present no concomitant control over pole attachments. The CRTC is a regulatory body charged with supervising the broadcasting industry, and its

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[102]Federal Communications Commission. Docket No. 18509, FCC 70-115. Final Report and Order, released February 4, 1970, p. 23.

[103]CRTC. "Licensing Policy in Relation to Common Carriers." Public Announcement, Dec. 3, 1969." The CRTC has concluded that it would not be in the public interest to encourage common carriers to hold licences for CATV systems: however, the Commission recognizes that the common carriers play an important role in the development of cable television and therefore, the CRTC hopes that the cooperation between the common carriers and the CATV industry will be maintained and expanded in order to ensure that CATV systems would have the ability to provide the necessary service to the public while maintaining control over their systems.

"The Commission hopes that agreements between CATV operators and common carriers will reflect the concern of the Commission as expressed above and will assist in the development of the Canadian broadcasting system. The Commission also expects that any such agreement entered into by licensees will not inhibit the ability of licensees to implement the policy expectations of this Commission with regard to the development of CATV.

"The Commission also realizes that under certain circumstances smaller common carrier companies may be the only entities capable of providing a CATV service as operators in certain of Canada's smaller population centres, and the Commission will, therefore, consider any such applications for licences of CATV systems by common carriers on their individual merits."

regulation of CATV is only in reference to cable's role in broadcasting. Since the Commission has stressed the local programming function of cable operators, it felt it desirable to refuse to grant cable licences, in effect broadcasting licences, to telephone companies. However, pole attachment agreements apparently do not seem to be of sufficient importance, in the view of the Commission, with regard to influencing the ability of cable operators to originate programming, so as to necessitate Commission involvement in the contractual relationships between cable and telephone companies.[104] While such contractual relationships are of great importance when the focus shifts to public policy regarding the wired city, telecommunications over and above broadcasting is beyond the jurisdiction of the CRTC.

Similarly, the Canadian Transport Commission is charged simply with regulating revenues and rates of Bell Canada in the traditional public utility regulatory sense. So long as CATV is considered a broadcasting entity, as opposed to a telecommunications system, Bell policies toward CATV will not be considered by the CTC.

The one federal governmental body that is concerned with the total telecommunications environment, including broadcasting as a subsystem of the total environment, is the

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[104] It is quite uncertain exactly how far the CRTC could go in influencing these contractual arrangements, even if it felt such steps to be desirable, since the CRTC has no control over the telephone companies.

Department of Communications. In response to a letter written to a high-placed DOC official, in which I requested comments on possible contradictions between CRTC cable policy and DOC views on the role of cable television in a complete telecommunications system, I received the following comments:

> (a) The CRTC's basic attitude toward CATV, and it is almost a direct echo of the FCC, is essentially a defensive one; the CRTC sees cable as threatening the existing broadcasting system rather than as constituting an entirely new broadcast system by which creating a condition of channel abundance could transform the at present moribund system.[105]
>
> (b) The CRTC is insisting that CATV operators originate programming, and this means that the tremendous potential of a broadband wired city system is being lost because, as broadcasters, cable operators cannot be permitted to operate other communication services anymore than common carriers are today permitted to become broadcasters. The DOC regulates the technical standards (i.e., interference) of CATV systems but not their hardware in a system sense, and so the present regulatory structure, at least in my judgement, is contradictory.

The powers of the Department of Communications are given by the Government Organization Act, 1969:[106]

> 9. The duties, powers and functions of the Minister of Communications extend to and include all matters over which the Parliament of Canada has jurisdiction, not by law assigned to any other department, branch or agency of the Government of Canada, relating to

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[105]This letter was written on Nov. 10, 1970, which was before the CRTC revised its cable regulations. The new regulations were much more liberal. See chapter IV *intra*. However, the contradictory regulatory environment is pointed out by item (a) above, even though the actual point made is less valid today.

[106]*Statutes of Canada*, 17-18 Elizabeth II, 1969, Chapter 28. An Act respecting the organization of the Government of Canada and matters related or incidental thereto.

(a) telecommunications, and
(b) the development and utilization generally of communication undertakings, facilities, systems and services for Canada.

Under the Act, the DOC may "coordinate, promote and recommend national policies and programs with respect to communication services for Canada,"[107] and "plan and coordinate telecommunication services for departments, branches and agencies of the Government of Canada,"[108] but since jurisdiction over cable and telephone have, in large measure, been given to other departments, the DOC is more of an advisory body than a planner with real authority.[109]

Similarly, the DOC has no control, except insofar as authority has been delegated to it under the Radio Act,[110] over the provincially chartered carriers. Such fragmentation of regulation will not allow for the development of the wired city concept. And the DOC will be even further removed from influencing decisions of the provincial regulatory boards than they are in co-ordinating policies between the CRTC and the CTC. While a more fragmented communications industry structure may be desirable in order to allow for the maximum benefits that can be derived from competition,

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[107] Ibid., section 10(a), p. 589.

[108] Ibid., section 10(d), p. 589.

[109] However, under the Radio Act, it has complete jurisdiction over the uses of the electromagnetic spectrum.

[110] The Statutes of Canada. R.S.C. 1952, chap. 233, as amended by 1952-53, c. 48; 1953-54, c. 31; 1955, c. 57; 1967-68, c. 25. An Act respecting Radio in Canada.

at the governmental regulatory level, such fragmentation of supervisory duties seems to have caused a stoppage in progress toward the wired city.

If it has been determined that the monopoly corporation is no longer a necessary, or even desirable instrument for implementing the total telecommunications policy, and when it has been realised at the same time that technology is imposing a unity[111] on all communications processes (such as television and book distribution), it then follows that it is no longer feasible to regulate the monopoly corporation in the traditional ways, while at the same time disregarding firms located at the periphery of the monopoly's service and technology, and it is no longer feasible to disregard the monopoly's reactions to these firms. While it may be desirable to limit the areas of monopoly to very narrow, specific areas, it becomes more necessary at the same time to enlarge the governmental supervisory framework to include all activities that are closely related to the activities of the monopoly corporation, in order to ensure that first, abuses do not occur because of the monopoly position of the one firm and second to co-ordinate activities in the associated competitive sphere to ensure that such competition takes a socially desirable direction and avoids uneconomic and wasteful duplication of services and facilities. At first glance,

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[111]That is, a similarity.

there may appear to be a paradox (and tension) in that technology is imposing unity on all communications technology and yet the feeling exists that the communications monopoly is no longer needed to supervise the development and implementation of that technology, and also in that while the monopoly market segment should be confined to definite areas, governmental supervision should be enlarged to encompass all communications fields.

There is perhaps a further paradox to be resolved in order to break the impasse in communications policy as described thus far, and this involves a decentralisation of regulation in a context of wider regulation:

> However, in the legislative processes leading to the establishment of the CRTC once again the net of control had to be thrown wider in order to circumscribe the growing circle of ancillary considerations which had to be subsumed in order to preserve the integrity of a closed system;--control of foreign ownership and development of Canadian content were broadened [in broadcasting]--provision was made for administrative machinery to permit the provinces to develop educational television--and it was proposed that CATV systems be brought into the national broadcasting system for the first time....
>
> More than three years after it has received its mandate to regulate CATV, the CRTC has yet to integrate these rapidly changing systems at the frontier of communication technology. Only three interim statements of policy, May 13, 1969, December 3, 1969 and April 10, 1970 have been issued to date,[112] and industry and public reaction to those ranging from merely confused to violent opposition is illustrative of the difficulties of encompassing the old and new within a single system.

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[112]See Chapter IV for the contents of the February 26, 1971 and July 16, 1971 statements and my evaluation of them, however.

The history of federal communication regulation is one of recurrent crises as the bureaucracy scrambles to overtake technology.[113] With each forward step of

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[113]The Commission's response to this charge would be contained in Pierre Juneau's reply to a question which asked whether the CRTC had the right to hold back technological change. Mr. Juneau said "There are techniques now and there will be more and more as time goes on which will allow you to do anything you want to do, so it is a little bit like money. You know, if you have lots of money, you can do all kinds of things. You have to decide what you want to do. I suppose that is what the Act means. You have to make sure that you use all the new technologies to the best advantage. The question is: What is the best advantage? We have said that to use a technology just because it is available without taking into consideration any other fact would lead to the destruction of the Canadian broadcasting system. Now, if we did not have the mandate to develop the system as it has been conceived by Parliament over the years, it would be different. But we do have that mandate.... If the Act says whenever microwave is available it should be used indiscriminately, that is fine. But that is not what the Act says. The technologies have to be used to achieve a policy." Standing Committee on Broadcasting, Films and Assistance to the Arts, House of Commons, Second Session, 28th Parliament, 1969-70. Minutes of Proceedings and Evidence No. 17, January 15, 1970, p. 17:37.

Contained in the two quotes are the two different regulatory philosophies that this chapter has attempted to highlight. On the one hand, there is a feeling that regulatory policy somehow imposes "unnatural" constraints on the behaviour of firms, that technological advance is somehow the more "natural" flow of events, and if governmental intervention is to take place at all, it should only be used in those areas in which abuses are clearly occurring. The role of government then is to be wholly negative in the sense it is to put an end to undesirable occurrences after experience teaches such occurrences are likely to continue.

On the other hand, there is a growing feeling, in no small part due to the automobile, that technology can get out of hand, and that if once let loose, the harms caused by technology may be unremediable. There should be a clear statement of social priorities and then known technology should be applied as far as is possible to help minimize these concomitant costs or harms. The latter concept, to borrow Mr. Juneau's phrase, is that of "ordered growth."

Put in another frame of analysis, the question government must ask is which priorities are to be promoted, in whose favour and at whose expense? The government must always make

technology the field of social interaction widens dramatically. Up to the present time accommodations appropriate to the situation have been possible while still preserving the centralised federal context of regulatory control. However, the pace of innovation has quickened. The lead-time from laboratory to everyday use has shortened. Crises now press so closely the necessity for adjustment is continuous. The move to integrate cable in the Canadian Broadcasting system is not just another step. It is a quantum leap. In all its ramifications--two way capability, permitting audience feedback--video cassette libraries--satellite links bringing programming from every country in the world instantly--computer technology--20+ channel capability--cable is moving our society irresistibly to an entirely new level of communications capacity. Television has had an immensely greater social impact than radio. Yet even at this early stage mature cable technology lying in the years to come bodes to make that impact seem like a mere whisper before the explosion.

Therefore, it is the main thesis of this brief that the past administrative practices and constitutional stances fostering centralised federal control are within the present technological context dysfunctional.

The new technology interacts with the total society. Adaptations to integrate in order to realise the maximum benefits must be made at all levels. In terms of the realities those technical functions now comprising the

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such decisions, since governmental inaction lends as much implicit support to one set of priorities and one vested interest group as does governmental action through law and regulation lend explicit support to a different set of priorities and a different vested interest group. The point is the government (once made aware of the conflict) can never be neutral, and governmental inaction involves as much governmental "interference" as does governmental action. See Warren J. Samuels. "Interrelations Between Legal and Economic Processes." Journal of Law and Economics, October, 1971.

The fact that it is becoming increasingly difficult to weigh all the areas in which a technological advance will have an influence does not mean that it is becoming any less important to try. As the externalities of each event successively increase, it becomes progressively more important that some decision-making unit attempt to account for them.

> Canadian broadcasting system constitute an open system. Too many external influences impinge increasingly upon it. It is a system moving increasingly to a more open state. To meet the challenge of these realities the regulatory and supervisory functions must be structured to maximize the system input of all levels of government. Only by the closest cooperation and coordination between all levels of government, federal, provincial and municipal, can the problems cable technology poses be mastered.
>
> The task is not merely the integration of cable into the broadcasting system, with the primary considerations being its use as a conduit for entertainment and its ancillary cultural effects, but rather the integration of cable into the social system, with all its manifest ramifications.[114]

In summary, while the federal government should probably widen its perspectives and integrate its fragmented bodies controlling communications, in order to remove the blockage in the development of telecommunications as exemplified by the cable-telephone impasse, there perhaps ought also to be a decentralisation of decision-making functions. Cable television can have a tremendous impact on the national systems of telecommunications and broadcasting, but its effects may be even more dramatic at the individual and community level through its potential in offering the promise of a new democratisation of information and entertainment. The interests of the local and provincial governments in policy decisions is obvious. Such decisions cannot be left wholly to the provincial or municipal authorities, however, since there is also a national interest in communications policy. But probably the worst possible regulatory situation is the one

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[114]Special Committee on the Media, Daniel Baum, head, Op. cit., pp. 24, 25.

that currently exists in all provinces but British Columbia, Ontario and Quebec wherein the provincial authorities have exclusive control over telephone service and the federal authorities control CATV. In such a case there is little hope for co-ordinated planning.

From the discussion of CATV's role in the complete telecommunications system, we now turn to its more specialised functions in the broadcasting system. This forms the exclusive concern of Chapter IV.

CHAPTER IV

THE IMPACT OF CABLE TELEVISION ON BROADCASTERS

I. Introduction

One of the reasons given in Appendix A to justify regulatory control over CATV was that over-the-air broadcasting is a legitimately regulated industry (due to spectrum scarcity), and since cable television may have a large impact on broadcasters, regulation must extend to CATV in order to ensure the performance desired of broadcast television.[1] Additionally, since the traditional concept of CATV, as a community aerial, makes it totally dependent upon broadcast signals for its viability, for which it has historically paid nothing, regulation may be justified in order to place

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[1]Seldom is regulation of an industry (or an industry sector) officially attributed to protection of competing industries (or sectors). For instance, United States trucking is said to suffer from excess capacity due to low entry barriers were it unregulated (see D. Pegrum, The Economics of Regulation (Homewood: Irwin), 1969, p. 486. Since unregulated sectors of the trucking industry have performed well, however (see W. Adams, "The Role of Competition in Regulated Industries" AER, 1958) one might conclude that regulation for these reasons is fairly prevalent.

On the public good aspects of television signals, compare Jora Minasian. "Television Pricing and the Theory of Public Goods," Journal of Law and Economics, 1964; Jora Minasian. "Public Goods in Theory and Practice." JLE, 1967; Paul Samuelson. "Public Goods and Subscription TV: A Correction of the Record," JLE, 1964; James Buchanan. "Public Goods in Theory and Practice: A Note on the Minasian-Samuelson Discussion," JLE, 1967.

some controls on the public goods that are offered for sale.

In the first instance, by delivering many more television signals into an area than are normally available, cable t.v. serves to fragment the audience of the local broadcasting stations. By reducing the total audience size, the television station becomes a less attractive advertising vehicle and the station's revenues may be expected to suffer. The fact that distant cable systems may carry the station beyond its normal coverage area, thus increasing its potential audience size does not totally alleviate the difficulty. In the first place, studies in the United States have shown that distant audiences are not worth as much to the advertisers as are audiences close to the home community of the t.v. station.[2] This is attributed to the fact the advertisers are even less able to pin-point their desired targets when television signals are carried over larger and larger geographic areas. For example, a local car dealer might consider the audience watching his advertisement via cable in a centre some hundred miles or more from his business as being next to worthless. Therefore,

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[2] Park estimated that each viewer added to a station's total audience by cable systems beyond the station's normal coverage area was worth about one-half that of the viewer within the ordinary coverage area. Rolla Park, "Potential Impact of Cable Growth on Television Broadcasting (Santa Monica: Rand), R-587-FF, Oct., 1970, p. 72. One Canadian broadcaster estimated in an interview that there were only two Canadian television stations that were able to sell this distant audience to advertisers--CFTO, Toronto and CFCF, Montreal, and even for these stations the distant audience was only worth about 1/8 the local audience.

even if one only assumes that cable results in a redistribution of audience composition, without affecting total audience size of each station, cable television will adversely affect total advertising revenues of each station.

In the second place, Park's study confirmed that in the United States the shifting of audience shares among stations because of cable would have a different impact according to the size of the station. This is due to the fact that each additional viewer to a station becomes worth successively less to the station (i.e. the marginal value of viewers declines). Therefore, stations in large urban centres, who may be expected to gain net audience, would not gain as much in advertising revenues as the stations in small centres would lose due to the decline in net audience.[3] Thus it would be expected that cable television may cause an over-all decline in television advertising expenditures vis à vis that which would exist were no cable present.

The third reason for concern about the effects of cable television upon traditional broadcasters concerns the openness of the economy. In a closed world, as one may assume the United States to be for these purposes, cable television will have either a zero impact on total viewer-hours devoted to the broadcasting system or increase this time somewhat. In a closed economy, viewer-time lost to one station will be made up by gains to one or more stations whose reception

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[3]Ibid., p. 36.

is attributable to cable. Additionally, the increased diversity of programme selection and improved reception may serve to increase total viewing time by making television a more attractive competitor for the consumer's time. These effects will serve to minimise the deleterious impact of CATV on the broadcasting system as a whole.

However, Canada is not a closed economy. In fact, the raison d'être of cable in Canada has been attributed to CATV's ability to bring in American signals to areas beyond these stations' normal coverage area.[4] The results of cable's ability to lessen total viewership of Canadian television are twofold. First, Canadian television stations become a less attractive advertising medium due to the decreased audience size. Stations will have to reduce their rate cards in order to maintain a competitive cost-per-thousand viewers for advertisers using television as opposed to other media. Total revenue will decline. Secondly, some advertisers, especially American firms with branch plants in Canada, may find it economical to abandon the Canadian broadcasting system altogether and attempt to reach the Canadian markets through advertisements placed on the United States stations.

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[4] Canadian Cable Television Association (CCTA): "Submission to the Special Senate Committee on Mass Media," March, 1970. (mimeo). p. 41. The brief continues that CATV is practically non-existent in areas too far removed from the United States border to receive United States channels without the aid of microwave relays, which have, until recently, been banned by the CRTC.

In this way, funds available for all Canadian advertising vehicles would decline by being syphoned across the border.

In the second place, cable television firms make use of a free good (to them) whose technical quality they often improve and offer for sale. Since television signals (programmes) are presently free goods to the cable operator, they are under no economic constraint in the use they make of them (other than the generally fixed costs of the head-end, or signal processing area, and the capacity of the cable to carry signals). Since cable subscriptions depend first upon the number of stations carried on the cable, and second upon the increased number of signals on the cable as opposed to off-air, the cable operator's profit maximising position will be at the point where the discounted revenues expected, resulting from extra subscribers attracted to the cable because of an extra channel, will equal the cost of providing that channel[5] (costs of antennae, filters, etc.). Therefore, without some government regulation, either government itself rationing channels or forcing CATV firms to compensate broadcasters for damages done, it is to be expected that cable operators will make a greater than socially-desirable use of channels in many cases.

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[5]At some point, adding channels will involve enlarging the capacity of the system--going from say a 12-channel system to a 20-channel system. Here, the operator will include all revenues expected from all the extra (8) channels, some of which may not be television transmission.

One must conclude, then, that predictions of CATV seriously hurting the Canadian broadcasting system (as we know it) have a strong theoretical basis.

In the following sections, (a) previous studies on the above question are cited and their major conclusions are brought forth and analysed; (b) data presented in previous studies are analysed carefully; (c) an econometric analysis is developed which attempts to determine the effect of cable on broadcasters, both in a total sense and marginally (adding channels successively); (d) the economics of broadcasting are explored with regard to the costs of programming and its financing, and cable's impact is related to this analysis; (e) in view of the above, CRTC cable television policies are evaluated in historical perspective.

II. Previous Studies

(i) Fisher and Ferrall[6]

This study was concerned with the impact on local stations not being carried by the cable system and of stations being duplicated on the cable (i.e. alternate stations carrying the same programmes).

The authors first derived the revenue-audience size relationship for 1963 in the United States as:

$$M = \underset{(45,270)}{103,300} + \underset{(0.39)}{26.63}\ A \qquad R^2 = .897^7$$

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[6] "Community Antenna Television Systems and Local Television Station Audience". Quarterly Journal of Economics 1966.

[7] Ibid., p. 232. The numbers in brackets are standard errors.

where M is total advertising revenue and A is average prime time audience for 487 stations. The results were interpreted as follows: "Audience was, therefore, valued at about $27 of yearly revenue per average prime time home...."[8]

Other significant conclusions from their regression analysis include:

(i) the introduction of a non-duplicative second service t.v. channel reduces local station viewing time from 53% of the available prime-time hours to 29% while total viewing time increases somewhat to about 59% of prime-time.[9]

(ii) By duplicating a station's programmes 10% of the time, average viewing of the channel falls by 6.8%.[10]

(iii) cable t.v. subscribers watch more television.[11]

(iv) the marginal loss to a station due to duplication is $380 per 1000 CATV subscribers per year for an additional half-hour duplication (per evening).[12]

However, since separate data was not available for off-air and CATV viewing, they could not estimate the impact

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[8] Loc. cit.

[9] Ibid., p. 242.

[10] Ibid., p. 245.

[11] Ibid., p. 248.

[12] Ibid., p. 249.

of increased diversity on local viewing time. They concluded that potential effects of cable were great and could seriously harm small stations and prevent new entrants.[13]

(ii) Seiden Report[14]

Seiden concluded that 50% of the United States' t.v. markets that are losing money do not have a significant CATV presence. The half that do are very small markets anyway. And there are many other markets where CATV is a significant force and the television stations remain very profitable.[15] The data summarised below is again for United States stations and cable systems.

For loss markets assumed to have a significant cable t.v. presence (6 in total), CATV subscribers account for a low of 9% and up to 50% of the net weekly circulation for the A and B contours of the stations. Carriage beyond the grade-B contours of the station by cable systems account for an additional 3-6% of the NWC.[16]

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[13] Ibid., p. 250.

[14] CATV Report (1970) (Washington: Martin H. Seiden and Associates), 1970.

[15] Ibid., p. 146.

[16] Net weekly circulation (NWC) is the net or unduplicated number of homes or individuals reached by a station at least once during a week. Grade-B and grade-A contours are iso-service contours and depend upon the effective height and effective radiation power of the transmitter. Technically, a grade-A contour defines an area within which the signal level is a sufficient strength to provide an "acceptable" picture at least 90% of the time at the best 70% of receiving locations (68 dBu for channels 2 to 6, 71 dBu for channels 7 to 13). Grade-B defines the outer limit

This was not an adequate study of the effects of cable t.v. on broadcasters. First, the study only attempts to relate the percentage of viewers able to receive the station by cable (as related to the total potential audience) to the number of markets in which losses are occurring. Stations whose revenues and profitability have decreased because of cable are not included in the analysis. Second, the analysis relates the significance of cable to markets losing money rather than t.v. stations. In other words, if a city had three t.v. stations, one quite profitable and two unprofitable, Seiden would ignore this market if the net profitability of the three stations was greater than zero. Third, net weekly circulation is a poor measure of potential audience since cable subscribers in the area who do not view the station at all during the period of analysis are dropped from the analysis. Fourth, the study disregards the possibility of increased cable saturation which may in turn affect more stations.

It must be concluded that it is very misleading to state that cable has probably only adversely affected six t.v. stations in small markets to such an extent they are losing money, and that stations in other areas continue to

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of an area in which an "acceptable" picture may be received 90% of the time at the best 50% of receiving locations, assuming an adequate antenna (47 dBu for channels 2 to 6 and 56 dBu for channels 7 to 13). See Robert O'Connor, "Understanding Television's Grade A and Grade B Service Contours" in IEEE Transactions on Broadcasting, Vol. BC-14, No. 4, December, 1968, p. 139.

be profitable in spite of cable.[17]

(iii) Johnson[18]

Johnson developed a theoretical analysis[19] showing both complementary and competitive effects of cable on broadcasters. His policy solutions involved stressing the complementary aspects, such as sharing of programme costs and distribution costs,[20] and perhaps even placing broadcasting and cable under common control.[21]

Since Johnson's theories are tested in Park's analysis, it is now convenient to turn to this paper.

(iv) Park[22]

Park estimates that, over-all, cable reduces t.v. station revenues, which are attributable to the local audience, by about 18%.[23] Whereas Fisher estimated the value of an average prime-time viewing home per year at $27, Park's estimate is $43. His equation is:

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[17]Seiden, op. cit., p. 146.

[18]Leland Johnson. The Future of Cable Television: Some Problems of Federal Regulation (Santa Monica: Rand), RM-6199-FF January 1970.

[19]Ibid., especially pp. 20-26.

[20]Ibid., p. 70.

[21]Ibid., p. 72.

[22]Rollo Park: Potential Impact of Cable Growth on Television Broadcasting (Santa Monica: Rand), R-587-FF October. 1970.

[23]Ibid., p. 4.

$$M = \underset{(0.22)}{13.4} + \underset{(81.34)}{43.20\ A} \qquad R^2 = .924$$

where again M = advertising revenue and A is average prime-time audience size for 543 stations in 1968.[24]

Significant results occur when an A^2 term is included[25]

$$M = \underset{(-4.13)}{-287.2} + \underset{(46.61)}{50 \cdot 45\ A} - \underset{(-7.57)}{.01197\ A^2} \qquad R^2 = .932$$

The inclusion of the A^2 term allows Park to estimate the value of an incremental prime-time home to a station for various absolute sizes of audience, and he finds for network affiliates this marginal value decreases from $48 to $30 per year as audience size grows from zero to one million homes.[26]

Other important conclusions drawn from his analysis are that the distant viewer is worth about 50% that of the local viewer to the station;[27] that on average in the United States cable has caused a decline in revenue for t.v. stations of 9% (18% in revenue attributable to loss in local audience less the gain in distant audience which is valued at 50%

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[24] Ibid., p. 37. The numbers in brackets are t-values.

[25] Ibid., p. 39. The numbers in brackets are t-values.

[26] Ibid., p. 40.

[27] Ibid., p. 72. Compare this to the estimate for Canada of a maximum of 12.5% given in footnote 2.

of the local audience--assuming total audience remains constant).[28]

There are some difficulties with the analysis,[29] but it is the best analysis to date.

(v) TvB[30]

The Television Bureau of Canada conducted a detailed one-station study on the effects of cable television on that station's (CFPL-TV-London) audience. TvB is an organisation wholly financed by the private sector of Canadian broadcasting, and acts in an advisory capacity to advertisers. One might expect, therefore, that the study might tend to minimise any adverse influences cable might have on television advertising. The declared purpose of the study was to determine whether audiences were fragmented to such an extent that this station became an ineffective and uneconomical vehicle for advertising.[31]

The study found the home station captured about 75% of the non-cable viewers at any time and combined with a neighboring CTV affiliate (CKCO-TV, Kitchener) for about 50% of

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[28] Ibid., p. 7.

[29] See the assumptions ibid., p. 29. Also, the reasonableness of drawing conclusions from a regression of revenues on audience size may be questioned as will be seen later.

[30] TvB. The Effects of CATV on Television Viewing (Toronto), 1970.

[31] Ibid., p. 3.

the cable audience at any given time.[32] For cable and non-cable homes combined, CFPL was found to account for about 50% of the available audience at any given time, while the other 50% was divided among six Canadian and fourteen United States stations.

From this TvB concluded that "... it is quite apparent that it is uneconomical and unnecessary to buy more than the home station for local market coverage."[33]

Table IV-1 below reproduces the most significant results of the study.

From Table IV-1 it will be noted that London and area is highly penetrated by cable--62% of the homes watching any television were subscribers. In the city of London itself, about 80% of the homes are subscribers. It is not possible to accurately determine the total impact of cable on the local station with the above data.

It can be seen that of the homes tuning in CFPL sometime during the day, cable homes tend to watch the station about 59% less than non-cable homes (row E). Also, while 96% of the non-cable homes watch the station sometime during the day, only 79% of the cable homes do this (rows A and E).

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[32] Ibid., p. 8. During network time periods, CFPL-TV and CKCO-TV each obtained about 25% of the total audience; in non-prime-time CFPL dominates in its home market.

[33] Ibid., p. 8.

Table IV-1. Impact of CATV on CFPL-TV

		average daily homes reached	% reached	hours tuned
A. All tv stations (20)	cable homes	43,000	91.5	5 hrs 07 min
	non-cable homes	28,000	89.5	4 hrs 41 min
	total tv homes	71,000	90.7	4 hrs 54 min
B. All U.S. Stations (13)	cable homes	36,300	77.2	2 hrs 31 min
	non-cable homes	3,600	11.5	0 hrs 16 min
	total tv homes	39,900	51.0	1 hr 47 min
C. All Canadian stations (7)	cable homes	39,700	84.5	2 hrs 35 min
	non-cable homes	27,600	88.2	4 hrs 24 min
	total tv homes	67,300	86.0	3 hrs 19 min
D. All Canadian stations less CFPL	cable homes	27,200	57.9	1 hr 05 min
	non-cable homes	10,000	31.9	0 hr 43 min
	total tv homes	37,200*	47.5	0 hr 56 min
E. Home station (CFPL)	cable homes	34,000	72.3	1 hr 29 min
	non-cable homes	26,900	85.9	3 hrs 41 min
	total tv homes	60,900	77.8	2 hrs 22 min

Source: TvB, op. cit., p. 9.

*Correction of error in original.

If it can be assumed that cable homes would watch CFPL for 3 hrs. 41 minutes a day were cable taken away, and that 96% of cable homes would tune in sometime, it is possible to predict that the removal of cable would increase CFPL-TV's total viewing time by 43,000 x .96 x (3 hrs. 4 min - 1 hr. 29 min.) ≈ 65,200 hours. It is known that 60,900 homes presently watch CFPL for 2 hours 22 minutes a day, for a total viewing time of 144,000 hours. Therefore, under these assumptions, the audience loss attributable to cable is 46% of its present audience, or 31% of the total expected audience.

There are many difficulties with the above analysis, not the least being that CATV homes in the London area tend to watch tv 26 minutes more daily than non-cable homes, and we do not know whether to attribute this to the presence of cable itself through its increased diversity and clarity of signals, or to the fact that cable tends to select out homes with a strong preference for television, or to some combination of the two. Also, since the study covered the whole of Middlesex county, much information is lost on the averaging; the removal of cable may be expected to cause much different changes in viewing habits for those located in London itself and those located throughout the county.

So while CFPL-TV may have retained its position as the most effective medium for advertising in the area when compared to all other available channels, both the effectiveness

of CFPL and television as a whole have been reduced. CFPL's effectiveness has been reduced due to its loss in audience; television's due to the number of channels in the area, competing with CFPL. In order to reach the 50% of the audience not tuned to CFPL, advertisers would have to buy time on twenty other channels in such distant centres as Cleveland and Detroit.

Just as significant as the results listed above for the effects of CATV on one station is cable's impact on the viewing-time of Canadian television. Non-cable homes watch television daily a total of 28,000 x 4 hrs. 41 min. = 128,200 hours and Canadian channels for 27,600 x 4 hours 24 minutes = 121,400 hours or 95% of the time. Cable subscribers tend to watch Canadian channels 39,700 x 2 hrs. 35 min. = 103,000 hours out of total viewing hours of 43,000 x 5 hrs. 07 min. = 219,000 hours or 47% of the time.

One must conclude, therefore, that if the results from this single market survey are typical of patterns throughout the country, the viability of the Canadian broadcasting system may be threatened.

It is interesting to note in passing that a similar study was undertaken for another Canadian station with the intention of publicising the results to show the viability of the station for advertisers. The results turned out to be even more dramatic than those in the London study, and so were not released.

(vi) CBC Research Studies[34]

Among the significant conclusions reached in these studies were the following:

1. Nationally, non-cable viewers watch United States channels 13.8% of the time (November, 1969), down from 14.9% of the time a year earlier (November, 1968); cable subscribers watch United States channels 35% of the time, up from 34.8 a year earlier. For all viewers, 17.9% of viewing-time is directed at American channels, compared with 17.8% a year earlier.[35]

2. CBC privately-owned English affiliates tend to suffer most from cable, their total viewing-time nationally falling from 20.4% for off-air viewers to 9.9% for cable viewers. CTV affiliates' share falls with cable from 20.5% to 16.7% while CBC English owned and operated stations fall from 14.7% to 13.5% of total viewing time. Viewing time of the English independent station is 2.7% of all viewing time for off-air viewers, and 2.9% for cable viewers.

French stations are affected to a surprising extent by cable. Cable causes the proportion of national viewing time devoted to French stations to decline from 28.3% to

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[34]Canadian Broadcasting Corporation: "The Impact of Cable Television on the Audiences to Canadian TV Stations" (mimeo), December, 1969. TV/69/74; and "Another Look at the Audiences in Canada to Cable Television" (mimeo) Apr. 1970. TV/70/73, "Extent of Use of Cable TV in Danada" (mimeo) March, 1969 TV/69/56.

[35]CBC. TV/70/37, op. cit., Table 2.

22.0% and this compares with 26.8% and 24.1% the year earlier.[36]

3. Stations with the biggest pre-cable audience suffer most from cable.[37]

4. Cable t.v. subscribers tend to watch on national average only about 6 minutes more television per week, for a weekly average of 23 hrs. 36 min.[38] This estimate is noticeably different from that in the TvB study which found an increase in viewing time for cable subscribers of about 26 minutes per day.

5. The United States' share of audience appears to have stabilised at ~35% for the studies conducted for 1968 and for 1969. CTV stations have increased their share of viewing by ~ 2% from the 1968 study (from 18.4% to 19.8%) while CBC affiliates and French stations shares have declined by about the same amount.[39] These results are shown

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[36] Loc. cit.

[37] Ibid., p. 5.

[38] CBC. TV/69/56, op. cit., p. 1. This surprising statistic was re-confirmed by the most recent CBC cable study which noted "... there is continuing evidence that, contrary to popular opinion, cable viewers, despite having access to many more channels on average spend no more time watching TV than do those who watch by more conventional means. In November 1970 the average cable viewer watched for 23 hours weekly, the average non-cable viewer for 22 hours 48 minutes--a difference of less than 2 minutes per day." CBC. "The Audience To Cable TV In Canada: An Update to November 1970." (mimeo.) April 1971. TV/71/35, p. 1. This result confirms one of the major results of my study--that given equal channel choice, cable and non-cable viewers show no significant differences in viewing patterns. See intra pp. 286-7.

[39] CBC TV/70/37, op. cit., p. 5.

in the part of CBC's table reproduced below as Table IV-2.

The CBC studies also provide a series of tables showing percentages of audience shares for all stations available for twenty-six municipalities, both for cable audience and non-cable audience. Below, Table IV-3 presents a summary of part of these twenty-six tables by showing the percent of time watching United States stations for cable and non-cable viewers for the twenty-six communities.

In Table IV-3 below I have declared that any channel with less than 0.5% of the off-the-air audience is unavailable to that area. A few homes in the municipality may be in an extraordinary reception area and hence may be able to receive it.

Similarly, if a station receives less than 0.5% of the cable audience it is assumed to be unavailable on the cable. Such a small audience share for a station on the cable may be due to three factors:

(i) in areas served by more than one cable system, only one system may carry the channel.

(ii) the channel is carried by the system for only a few hours a day when cable "space" becomes available.

(iii) The channel is so unpopular it may be ignored. The first two factors would over-state the channel diversity were these channels included in the Tables.

From analysing Table IV-3 the most obvious conclusion is that the American channels have very little impact in

Table IV-2. Changes In Total Time Spent Viewing Television in Canada via Cable and by Direct Off-Air Means. By Category of Station.

	November 1969			Change 1968-69		
	total %	off-air %	cable %	total %	off-air %	cable %
English language						
CBC-owned	14.5	14.7	13.5	+0.2	+0.1	+1.0
CBC-affiliate	18.4	20.4	9.9	-2.1	-1.6	-1.9
CTV	19.8	20.5	16.7	+1.4	+1.5	+2.2
Independent	2.4	2.3	2.9	-0.2	+0.4	+0.6
United States	17.9	13.8	35.0	+0.1	-1.1	+0.2
Total:	73.0	71.7	78.0	-0.6	-1.5	+2.1
French language						
CBC-owned	7.2	7.5	5.7	+0.5	+0.7	-0.2
CBC-affiliate	7.0	7.2	6.5	-0.1	+0.1	-0.5
Independent	12.8	13.6	9.8	+0.2	+0.7	-1.4
Total:	27.0	28.3	22.0	+0.6	+1.5	-2.1
Total all stations	100.0	100.0	100.0			
Base for percentages: total hrs. spent viewing (millions)	448.0	362.5	85.5	% change +1.4	-3.6	+30.7
Distribution of all viewing time between cable and off-air	100.0	80.9	19.1	% change --	-4.9	+4.3

Source: CBC TV/70/37, op. cit., Table 2.

Table IV-3. Distribution of Audience Shares between United States and Canadian Television Stations for Cable and Off-the-Air (November 1969)

	total hrs viewing all television ('000) (%)	total hrs viewing off-air ('000) (%)	total hrs viewing via cable ('000) (%)	% hrs viewing U.S. stations (cable & off-air)	% hrs viewing U.S. stations off-air	% hrs viewing U.S. stations via cable	No. U.S. channels avail. off-air	No. U.S. channels avail. via cable	No. Can. channels on cable	No. Can. channels avail off-air
1. Brampton	1241.4 (100%)	828.0 (66.7%)	413.4 (33.3%)	33.3	28.3	43.3	3	3	5	5
2. Brantford	1250.3 (100.0	761.7 (60.9%)	488.6 (39.1%)	43.3	39.3	49.5	4	4	5	5
3. Cornwall	1123.9 (100.0%)	446.6 (39.7%)	677.3 (60.3)	36.7	18.9	48.5	3	4	5	5
4. Drummond-ville	1156.2 (100.0%)	856.6 (74.1%)	299.6 (25.9%)	0.6	-	2.3	0	2	6	7
5. Granby City	932.5 (100.0%)	800.9 (85.9%)	n.a.	3.9	1.0	n.a.	1	n.a.	n.a.	5
6. Guelph	1006.0 (100.0%)	412.5 (41.0%)	593.5 (59.0%)	37.7	25.9	45.9	3	3	6	5
7. Hamilton	10418.9 (100.0%)	7289.4 (70.0%)	3129.5 (30.0%)	45.0	42.1	51.8	3	3	5	4
8. Kitchener	4028.7 (100.0%)	2321.2 (57.6%)	1707.5 (42.5%)	27.1	16.8	41.0	3	3	6	6
9. Lethbridge	692.4 (100.0%)	487.8 (70.5)	204.6 (29.5)	8.4	-	27.7	0	2	2	2
10. London	4550.5 (100.0%)	1157.3 (25.4%)	3393.2 (74.6%)	37.4	5.1	48.3	3	8	3	3
11. Montreal	57476.6 (100.0%)	47931.2 (83.4%)	9545.4 (16.6%)	7.6	3.6	27.1	2	3	6	5

continued

Table IV-3--Continued

	Total hrs viewing all television ('000) (%)	total hrs viewing off-air ('000) (%)	total hrs viewing via cable ('000) (%)	% hrs viewing U.S. stations (cable & off-air)	% hrs viewing U.S. stations off-air	% hrs viewing U.S. stations via cable	No. U.S. channels avail. off-air	No. U.S. channels avail. via cable	No. Can. channels on cable	No. Can. channels avail off-air
12. Oshawa	2077.9 (100.0%)	1578.2 (76.0%)	499.7 (24.0%)	43	41.3	48.3	3	5	5	4
13. Ottawa-Hull	11492.3 (100.0%)	5756.6 (50.1%)	5735.7 (49.9%)	10.2	1.0	19.5	1	2	9	5
14. Peterborough	1117.5 (100.0%)	534.4 (47.8%)	583.1 (52.2%)	38.6	23.5	52.4	6	5	4	5
15. Quebec City	11193.6 (100.0%)	10004.9 (89.4%)	n.a.	0.7	n.a.	n.a.	0	0	n.a.	3
16. St. Catherines	2521.9 (100.0%)	2254.4 (89.4%)	n.a.	54.5	54.0	n.a.	3	3	n.a.	4
17. Sarnia	1366.9 (100.0%)	908.8 (66.5%)	458.1 (33.5%)	72.6	75.2	67.5	4	5	4	2
18. Sault Ste Marie	1810.4 (100.0%)	1414.2 (78.1%)	396.2 (21.9%)	37.1	30.5	60.8	2	6	1	1
19. Shawinigan	1566.6 (100.0%)	448.0 (28.6%)	1118.6 (71.4%)	0.5	0	0.7	0	1	7	8
20. Sherbrooke	1957.8 (100.0%)	752.5 (38.4%)	1205.3 (61.6%)	13.4	11.0	15.0	3	3	5	5
21. Thunder Bay	2210.4 (100.0%)	723.1 (32.7%)	1487.3 (67.3%)	42.7	8.5	59.3	2	3	1	1
22. Toronto	43195.2 (100.0%)	32130.0 (74.4%)	11065.2 (25.6%)	42.0	41.5	43.4	3	4	6	4

continued

Table IV-3--Continued

	total hrs viewing all television ('000) (%)	total hrs viewing off-air ('000) (%)	total hrs viewing via cable ('000) (%)	% hrs viewing U.S. stations (cable & off-air)	% hrs viewing U.S. stations off-air	% hrs viewing U.S. stations via cable	No. U.S. channels avail. off-air	No. U.S. channels avail. via cable	No. Can. channels on cable	No. Can. channels avail. off-air
23. Trois Rivières	2469.1 (100.0%)	965.3 (39.1%)	1503.8 (60.9%)	1.2	0.0	2.1	0	1	7	7
24. Vancouver	18114.8 (100.0%)	8215.4 (45.4%)	9899.4 (54.6%)	49.3	41.9	55.4	4	5	3	3
25. Victoria	3693.7 (100.0%)	914.2 (24.8%)	2779.5 (75.2%)	58.2	55.0	59.3	5	7	3	3
26. Winnipeg	11946.4 (100.0%)	9805.4 (82.1%)	2141.0 (17.9%)	23.6	19.2	43.6	1	4	3	3

Source: CBC Research Report, TV/70/37, op. cit.

mainly French speaking communities (except for Montreal). In the six Quebec cities (4, 5, 15, 19, 20, 23) in the study, the American stations gain a maximum of 15% of the cable viewing time (that being in Sherbrooke where three channels are available); in all other Quebec cities, it is well under 5%.[40]

Viewership of United States channels is much more dramatic in predominantly English speaking communities, however.

There is one exception to a general rule that even when cable brings in more Canadian stations than are normally available off-air cable always causes a decline in viewing-time of Canadian channels. In Sarnia two CBC affiliates (CFPL and CKLW) may be received by off-the air means, while cable brings in the CTV affiliate, CKCO and independent CHCH in addition to the previously mentioned CBC affiliates. Below part of CBC's Table 20 is reproduced as Table IV-4 to analyse this situation more carefully:

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[40] In Granby City, the cable sample was too small for the CBC to project accurate figures. However, if one can assume 14.1% of the houses have cable, that an over-all 3.9% of viewing time of United States stations is accurate and that 1% of the off-the-air viewing time is American, then the CATV subscribers watch United States channels for 21.4% of total viewing hours. TV Factbook No. 39 lists the channels being carried by the Granby cable system as being composed of 3 United States channels and 5 Canadian channels. There are 1200 subscribers with 5000 homes passed by the cable, for a penetration of cable of 24%. This does not compare well with CBC's figure of 86% of total viewing audience being off-air. One might suppose that a large portion of cable subscribers in Granby are English speaking who have subscribed to cable in order to receive United States channels, but the over-all penetration of cable is low. See TV. Factbook No. 39, 1969-70 at page 632a.

Table IV-4. Audience Shares by Station Category--Cable and Off-Air. Sarnia, November 1969

Category of Station	Total Viewing	Viewing Off-Air	Viewing via Cable
CBC English Affiliate	24.0	24.5	23.3
CFPL - London	13.5	12.9	14.7
CKLW - Windsor	10.4	11.4	8.6
CKNX - Wingham	*	*	-
CTV	2.7	*	7.2
CKCO - Kitchener	2.7	*	7.2
Independent English	0.7	-	2.0
CHCH - Hamilton	0.7		2.0
United States	72.6	75.2	67.5
WJBK	26.8	30.0	20.4
WWJ	20.7	21.8	18.7
WXYZ	18.1	20.9	12.5
WKBD	6.4	2.4	14.2
WTVS	*	*	1.0
WJRT	*	*	*
WKYC	*	-	*
WNEM	*	*	-

Source: CBC Report, TV/70/37, op. cit., Table 20.

* less than 0.5%

From the above Table it will be noted that the introduction through cable of alternate Canadian service (CKCO and CHCH) caused CKLW's share of the cable audience to decline from 11.4% to 8.6%, a fall of 19.5% from its off-air share. Two American stations experienced a comparable decline, WJBK (32%) and WXYZ (49.5%). One United States station experiences a great gain--WKBD (480%). These results are listed in more detail in Table IV-5 below.

Table IV-5. Relative Impact of Cable by Station (Cable vs. Off-Air). Sarnia, November 1969

Station	Change in relative viewing time (cable vs. off-air) %	Change in viewing time as a % of off-air viewing
CFPL	+1.8	+7.4
CKLW	-2.8	-19.5
CKCO	+7.2	not defined
CHCH	+2.0	not defined
Total Canadian	+1.2	+4.9
WJBK	-9.6	-32.0
WWJ	-3.1	-14.2
WXYZ	-8.4	-40.5
WKBD	+11.8	+480.0
WTVS	+ 1.0	not defined

Source: Table IV-3.

Increasing the diversity of Canadian programmes, by making available both the CTV network and an independent station in addition to the existing CBC affiliates, has caused a relative increase in viewing time of Canadian

television of only 4.9%. Cable has caused a relatively greater shifting of audience shares among Canadian stations and among American stations than between Canadian and American stations. From this one might conclude that Canadian channels are considered very good substitutes, as are American channels, but that Canadian and American channels are poor substitutes.[41] This would indicate that there may be a fairly large audience for American stations regardless of the number of United States channels.

All of the remaining English speaking communities show a decline in the time spent watching Canadian channels for CATV subscribers when compared to non-CATV households. For cable households, viewership of United States channels in these communities is at a low of 27.7% in Lethbridge, 19.5% in Ottawa--Hill (which has a very large French speaking population) and 27.1% in Montreal (with a majority population that is French speaking). Cable systems in these communities bring in respectively 2, 2 and 5 United States channels. In all of the remaining communities with a large English speaking population, American channels capture from 41% (Kitchener) to 67.5% (Sarnia) of the cable audience, and in each case at least three United States channels are available on the cable.

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[41]My econometric analysis *infra* will refine this conclusion further such that CTV and American stations appear to be good substitutes but that they are poor substitutes for CBC stations.

There appears to be little correlation between viewership of United States channels and number of United States channels when that number is three or greater (eg. residents of Thunder Bay and Victoria watch United States channels 59.3% of the time on cable, while Victoria has available 7 United States channels (and 5 Canadian) while Thunder Bay has available 3 United States channels (and 2 Canadian). Similarly, Brantford residents, with 4 United States channels on the cable, watch United States television 49.5% of total viewing time while in London (with 8 United States channels) viewers spend an equivalent 48.3% of the hours tuned to United States channels. Brandford has 4 Canadian channels available compared to London's 3.

I have calculated the correlation coefficient between the number of United States channels available to communities via cable and average percentage viewing-time of United States stations by cable subscribers for municipalities able to so receive three or more United States channels. I have removed from the sample municipalities with a large French speaking population (Cornwall, Montreal, Granby, Sherbrooke). It should be remembered that by dealing only with the cable tv audience, American and Canadian stations are of comparable picture quality, and so by dealing only with cable viewing shares it has been possible to isolate the competitive struggle for viewer-time into consumer programme preferences since the United States stations are not at

a competitive disadvantage due to any picture quality inferiority. The correlation coefficient was determined to be $r = +.388$.

While r has the expected sign (positive--increasing the number of United States channels results in an increase in viewing-time devoted to United States channels) it is much lower than might intuitively be expected.

While this chapter contains an analysis using stronger data and regression techniques to study the movements of these two variables later on, it is tentatively concluded that viewing-time of United States channels is fairly independent of the number of United States channels available for United States channels greater than two in number. Geometrically, this relationship can be represented in Figures IV-1 and IV-2 below.

If this hypothesis is determined to have any validity, it will have significant public policy implications.

(iii) CRTC[42]

The problem of the extension of the coverage area of United States channels into Canada has been a chief concern of the CRTC. For example, they state:

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[42]Canadian Radio-Television Commission. "The Improvement and Development of Canadian Broadcasting and the Extension of United States Television Coverage in Canada by CATV," Public Announcement, Dec. 3, 1969; CRTC Annual Report 1968-69; Annual Report 1969-70.

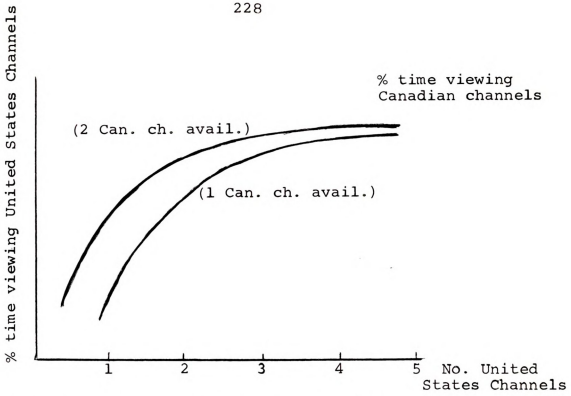


Figure IV-1. Percent of Time Watching United States Channels as a Function of the Number of United States and Canadian Channels.

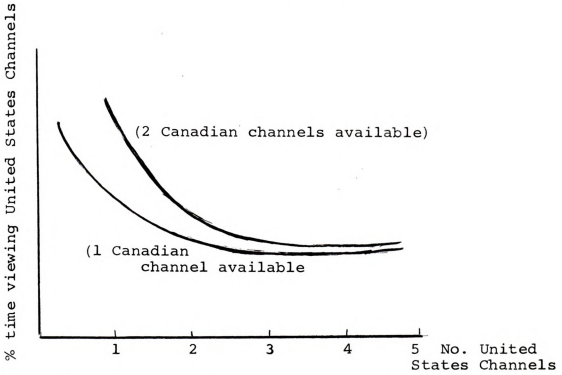


Figure IV-2. Percent of Time Watching Canadian Channels as a Function of the Number of United States and Canadian Channels.

> The problem facing the Commission is not whether the technology of microwave should be used to help the development of cable television. It is to decide whether the use of additional techniques should be authorized to enlarge the coverage area of U.S. networks and U.S. stations and therefore their advertising markets in Canada.
>
> The rapid acceleration of such a process throughout Canada would represent the most serious threat to Canadian broadcasting since 1932 before Parliament decided to vote the first Broadcasting Act. In the opinion of the Commission, it could disrupt the Canadian broadcasting system within a few years.[43]

The CRTC presents a table which shows the historical shares of audience for Canadian and United States television stations for six metropolitan areas. This table is reproduced as Table IV-6.

Based on this small sample of cities one would be tempted to conclude that Canadian broadcasting has withstood the competitive pressures from outside and has indeed been gaining strength. In all of the centres listed (except Winnipeg) clear United States signals could be received off-air in 1960, and generally these stations attracted 2/3 of the total viewing time. The strength shown by Canadian stations since 1960 may be attributed in part to the arrival of second Canadian service in these areas. CFTO-Toronto, an original member of the CTV network, first went on the air in 1960.

Windsor has never had alternate Canadian service and the viewership of the local station has shown a steady

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[43] CRTC. Public Announcement, Dec. 3, 1969, op. cit., p. 1.

Table IV-6. Shares of Weekly TV Audience--Canadian vs. United States Stations (households for 1960-66; persons for 1967 and 1968)

	1960 %	1961 %	1965 %	1966 %	1967 %	1968 %
Montreal						
Canadian	90.5	94.3	92.9	92.0	93.9	94.3
United States	9.5	5.7	7.1	8.0	6.1	5.7
Kingston						
Canadian	28.4	30.9	31.1	37.7	32.6	39.6
United States	71.6	69.1	68.9	62.3	67.4	60.4
Toronto						
Canadian	30.6	44.2	52.2	54.3	56.3	55.9
United States	69.4	55.8	47.8	45.7	43.7	44.1
Windsor						
Canadian	26.7	27.8	26.8	28.0	21.8	21.5
United States	73.3	72.2	73.2	72.0	78.2	78.5
Winnipeg						
Canadian	100.0	98.2	80.2	85.9	84.3	79.6
United States	-	1.8	19.8	14.1	15.7	20.4
Vancouver						
Canadian	35.5	51.3	54.4	56.3	50.0	51.0
United States	64.5	48.7	45.6	43.7	50.0	49.0
Six Metro Total						
Canadian	61.1	69.4	70.8	71.6	71.9	72.1
United States	38.9	30.6	29.2	28.4	28.1	27.9

Source: CRTC Public Announcement, Dec. 3, 1969, op. cit, Appendix 4, page 10.

decline. The data for Winnipeg reflects the arrival of United States service.

These data may somewhat contradict the previous conclusions. It is indicated by Table IV-6 that Canadian channels are indeed effective substitutes for United States channels and that by increasing diversity in this way, these stations in total can effectively win audiences away from United States stations.

One explanation of this contradiction could be that at a given point in time there appears to be a generally fixed audience for American stations and this audience depends very little upon the number of United States and Canadian stations available; at the same time, however, it appears that by increasing the availability of Canadian channels through time, total Canadian viewing time tends to rise significantly.

One must be cautious in making any public policy decisions based on the above analysis, however. While increasing the availability of Canadian channels may raise total viewing time of the Canadian broadcasting system, individual stations will suffer an off-setting decline in viewing time, due to the competition and resulting audience fragmentation among these competing channels.

In the CRTC Annual Report, 1969-70 Appendix III presents a provincial breakdown by electoral districts of United States viewing by non-cable and cable users. It is significant that of the 271 electoral districts listed, in

only 27 does cable have a positive influence on viewing time of Canadian channels. Of these 27, 12 show an increase of less than 1% which, due to sampling error, probably indicates no change. Of the remaining 15 electoral districts, 7 show the off-air audience of Canadian stations to be less than 100% while the cable audience is exactly 100% of all viewing time. This surprising result may be attributed to the wide geographic extent of some of these districts and the fact that cable systems only cover a small part of this area. Only two of these seven districts had a non-cable viewership of United States stations greater than 5% of total viewing time, and even with these two it is difficult to attribute the increased viewing of Canadian stations by cable audiences to the cable. There remain eight districts in which cable may have had a significant positive impact. These eight districts are listed in Table IV-7.

Of the eight districts listed in Table IV-7, six are in Ontario. Essex, Kent and Sarnia border Michigan: Welland, Niagara Falls and Leeds county border New York State. In all of the above counties, there is an abundance of United States signals off-air. CTV network service, however, is not available or only weakly available. Cable in these areas serves to increase the range of Canadian stations.

Census Division 6 in Manitoba is on the United States-Canadian border, and is some distance from Winnipeg. Cable may improve the picture quality of the Winnipeg stations.

Table IV-7. United States Viewing by Cable and Non-cable Viewers where Cable Significantly Decreases United States Viewing Time--By Electoral Districts (November 1968)

Centre	non-cable viewer-hrs %	cable viewer-hrs %	non-cable and cable viewer-hrs %
1. Brome, Missisquoi, P.Q.			
Canadian	81.67	90.22	82.01
United States	18.33	9.80	17.99
2. Essex County Ont.			
Canadian	22.93	47.62	28.83
United States	77.07	52.38	76.17
3. Kent County Ont.			
Canadian	24.94	31.01	25.30
United States	75.06	68.99	74.70
4. Sarnia Ont.			
Canadian	24.95	32.42	27.56
United States	75.05	67.58	72.44
5. Welland County Ont.			
Canadian	32.19	53.62	32.27
United States	67.81	46.38	67.73
6. Niagara Falls Ont.			
Canadian	35.47	53.62	35.67
United States	64.53	46.38	64.33
7. Leeds County Ont.			
Canadian	37.99	43.82	39.04
United States	62.01	56.18	60.96
8. Census Div. 6 Man.			
Canadian	78.25	88.37	78.23
United States	21.75	11.63	21.67

Source: CRTC Annual Report 1969-70, pp. 296-327.

Brome and Missisquoi counties are situated on the Quebec-United States border and similar conclusions apply.

The above confirms that cable may be of benefit to Canadian stations in those cases where an abundance of United States signals are available off-air.

(viii) Special Senate Committee[44]

The Report cited some of the data sources referred to above and explained the concern that has been expressed for the future of Canadian broadcasting.

One statistic brought forward by the Committee was that there is significantly less advertising per t.v. home in British Columbia than in the other provinces. This is attributed to the fact that United States viewing time is approximately four times greater for cable homes in British Columbia than non-cable homes and that British Columbia has a high penetration of cable.[45]

Significantly, the introduction of cable has done relatively greater harm to KVOS than the Vancouver stations.[46] The introduction of more United States channels than are normally receivable has caused a significant fragmentation of the one United States station whose raison d'être is to beam signals into Canada and collect Canadian advertising.

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[44] Special Senate Committee on Mass Media Report (3 vols). (Ottawa: Queen's Printer, 1970).

[45] Ibid., pp. 387-8 of Vol. 2.

[46] Ibid., p. 387.

This reinforces the previous conclusions. The position of KVOS in the British Columbia broadcasting industry will be given greater attention later in this chapter.

III. Econometric Model[47]

In this section, an econometric model of the viewing patterns of cable subscribers and off-air viewers is developed which is integrated into a full-scale model describing the financial impact that CATV has on over-the-air broadcasters.

The data used in the model were supplied by the CRTC. The viewing statistics originated from a Bureau of Broadcast Measurement survey conducted for the period of October 27 to November 9, 1969. The survey estimated the average weekly viewing hours for all television stations receivable in Canada for both off-air and cable viewers. These data were available for all Canadian counties and metropolitan areas in which television was viewed.

The television revenue data originated from the financial returns that television stations are required to send annually to the CRTC. Data for 54 privately-owned television stations in Canada in the year 1970 were used in the regressions.

Before describing the integrated econometric model, which is the heart of this section, the results of regression

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[47]I wish to acknowledge my debt to the Canadian Radio-Television Commission for supplying the data used in this section and for granting me computer time.

equations which attempt to explain and predict the overall influence of American channels on the proportion of time Canadians devote to watching Canadian television are presented below. It will be noted that these equations do not deal with the viewing times of particular television stations (from which one may deduce the financial impact caused by the shifting viewing patterns), but rather the viewing times devoted to the Canadian television system.

More precisely, the equations theorise that the percentage of total television viewing time spent watching all Canadian channels in total is a function of the number of Canadian channels available and the number of American channels available. The results will permit an assessment of the reasonableness of the hypothesis on page 226 supra and Figures IV-1 and IV-2.

In order to run such equations as described above, it is first necessary to develop a standard by which one may declare whether or not a given channel is available in an area. This is a difficult problem owing to the wide geographical extent of some of the sample populations. A given station may attract a sizeable audience in one part of a county, while being unavailable in other areas of the county. This problem becomes less serious, of course, as the area included in the sample decreases, and for this reason metropolitan areas and small counties were used as much as possible in the sample.

The standard finally adopted consisted of two rules. First, any station which obtained 0.5% or less of total viewing time in the sample area was assumed to be unavailable. Such a standard is clearly acceptable for off-air viewing, but when applied to cable viewing may bias the results somewhat. Such a low percentage viewing time when applied to CATV viewers may indicate the station is simply not very popular, in which case it should be included in the data. It may also indicate, however, that not all cable systems in the sample area (county or metropolitan area) are carrying the station, or that this station is not being carried for the full broadcast day, in which case the station should not be included in the data. In cases in which several stations showed individual viewing times of less than 0.5% of total viewing time, but cumulatively accounted for over 1% of total viewing time, the number of stations said to be available was adjusted upward. For example, if 5 stations each accounted for 0.4% of total viewing time, and cumulatively 2.0% of total time, 2 such stations were declared to be available.

A second, interacting standard, or guideline, was also used. In cases where the off-air viewing share of a station was less than 10% but its share of the cable viewing time more than twice its off-air share, the station was assumed to be unavailable off-air. Obviously, when speaking of off-air availability of stations, it is necessary to keep in mind a continuum of receptions from excellent pictures to

very weak pictures, and when one tries to fit a whole continuum into only two groups (available and not available) difficulties arise. However, it seems reasonable to assume that a station with a small but significant off-air viewing share, and which more than doubles its viewing share when placed on an equal footing with other, less distant, stations via cable, is a highly desirable station which carries some programmes for which many viewers are willing to put up with an inferior picture, but which station on the whole carries programmes that many viewers would like to watch but for which they are not willing to sacrifice a good technical picture. Such a large increase in these stations' relative viewing shares when placed on cable is indicative of a general unavailability off-air, even though some off-air viewers, whether through superior location, or expensive aerials, or sacrifice in picture quality, may spend considerable time watching the station.

This second standard combines with the first standard for those cases mentioned earlier, when several stations, each with less than 0.5% of the total off-air viewing time but cumulatively more than 1%, are investigated. If some of these stations obtain more than twice the off-air viewing share on cable, they are declared to be unavailable off-air, and when cumulating the percentage shares of such marginal stations they are removed from the total.

These standards may more accurately be termed guidelines. Recognising the arbitrariness of such rules, a case

by case approach was taken and other factors were brought in, where appropriate, to determine whether a station was or was not available. For example, if the county being studied was small in geographic extent, it was felt the error caused by omitting a station with a viewing share of close to 0.5% might be greater than that caused by including it; the opposite held true for counties covering a large geographic area. The sample of counties and metropolitan areas was chosen to minimise the number of such decisions, however; this in turn served to limit the sample population.

Another factor limiting the sample size was a desire to prevent biases in the sample. Populations were chosen only in cases in which there was a significant cable presence, in order that both sets of equations (off-air and cable viewing patterns) would reflect the same populations, differing only in factors related to the acts of subscribing and not subscribing to cable television. In this way, whatever biases that may have been left in the sample through the selection process should apply equally to both the off-air and cable t.v. equations and as a result it is to be hoped that more confidence may be placed in any differences in viewing patterns that show up in the equations estimated for these two groups. These remarks should be borne in mind throughout the analysis in this section.

In attempting to estimate the impact of American television stations on the proportion of time spent watching

Canadian television stations, sample populations of cable viewers and off-air viewers were used and treated separately; however the same functional forms were fitted for each population. As stated earlier, each of these populations were chosen from the same geographic area. The sample size used was 63 counties and metropolitan areas for both the cable and non-cable sample.

Three functional forms were used--a simple linear regression of the number of United States and Canadian channels available on percentage viewing time of all Canadian channels available, a Cobb-Douglas or double log function, and the simple regression of the number of Canadian and United States signals described above which includes this time the square of the number of United States signals.

A priori one might feel the Cobb-Douglas function would give the best fit since it allows both for the interaction of the number of Canadian and United States channels on percentage viewing time and for a decreasing effect on viewing time as the number of United States channels is increased. The simple regression has neither of these merits, while the simple regression with the number of United States channels squared allows for only the latter.

Equation 1-A, 1-B and 1-C below present the results obtained by fitting data for off-air viewing to the three functional forms, and equations 2-A, 2-B and 2-C show parallel results for cable viewing.

1-A Simple regression, off-air.

$$\frac{Vc}{Vt} = \underset{}{0.936} + \underset{(1.773)}{0.033X_1} - \underset{(-9.976)}{0.116X_2} \qquad r^2 = .62$$

where Vc = total Canadian viewing hours, off-air

Vt = total television viewing hours, off-air

X_1 = number of Canadian channels, off-air, plus 1

X_2 = number of United States channels, off-air plus 1.

The coefficients of X_1 and X_2 have the expected signs and are significant at the 95% level. The numbers in parentheses are t-values.

1-B Cobb-Douglas, off-air.

$$n \log \left(\frac{Vc}{Vt}\right) = \underset{}{-0.325} + \underset{(2.609)}{0.273\ n \log X_1} - \underset{(-10.483)}{0.489}$$

$$n \log X_2 \qquad r^2 = .65$$

This equation may be rewritten in the following form:

$$\frac{Vc}{Vt} = 0.325\ X_1^{0.273}\ X_2^{(-0.489)}$$

1-C Simple regression with X_2^2 included, off-air.

$$\frac{Vc}{Vt} = \underset{}{1.111} + \underset{(2.739)}{0.044X_1} - \underset{(-7.679)}{0.305X_2} + \underset{(4.898)}{0.029X_2^2} \qquad r^2 = .73$$

It may be well to pause momentarily and compare the results of the above three functional forms. One may reach the following conclusions:

1) In all cases, the coefficients of the X_1, X_2, X_2^2 variables are significant at the 95% level.

2) Both the coefficients of the X_2 and X_2^2 terms and their t-values are greater than the coefficients and t-values of the X_1 variable. This indicates that generally it may be predicted that successive additions of United States channels will have a greater negative impact on Canadian television viewing time than the positive influence of successive additions of Canadian channels, and one may place greater reliance upon the negative impact of United States channels than on the positive influence of Canadian channels.

3) Equations 1-B and 1-C show higher r^2's than equation 1-A, and the X_2^2 coefficient of 1-C is significant at greater than the 99.75% level of confidence, indicating indeed a declining influence of the number of United States channels on Canadian television viewing time as the number of United States channels increases.

4) Equation 1-C gives the highest r^2 indicating that perhaps the interaction of the number of Canadian channels and United States channels is not significant.

In Tables IV-8 and IV-9 are presented the estimated share of total viewing time for Canadian channels for various combinations of Canadian and United States channels as derived from equations 1-B and 1-C respectively. The reader should bear in mind that the Xi of equations 1-B and 1-C represent one plus the number of channels available.

A word of explanation regarding the functional form used in equation 1-C (and hence regarding the results of

Table IV-8. Estimated Percentage Viewing Time of Canadian Television Channels for Various Combinations of Canadian and United States Channels Off-Air

Number of Canadian Channels	Number of United States Channels						
	1	2	3	4	5	6	7
1	62	51	44	40	36	33	32
2	70	57	50	44	40	38	35
3	74	62	53	48	44	41	38
4	80	65	57	51	47	43	41
5	84	68	60	54	49	46	43
6	88	72	63	56	51	47	44

Source: Equation 1-B ($\text{nlog}\frac{Vc}{V_t} = 0.325 + 0.273\ \text{nlog}X_1 - 0.489\ \text{nlog}X_2$).

Table IV-9. Estimated Percentage Viewing Time of Canadian Television Channels by Off-Air Viewers for Various Combinations of Canadian and United States Channel Availability.

Number of Canadian Channels	Number of United States Channels						
	1	2	3	4	5	6	7
1	71	55	44	40	41		
2	75	59	49	44	46	(25)	
3	79	63	53	49	50		
4	84	68	58	53	55	(58)	
5	88	72	62	58	59		
6	93	77	66	62	63		

Source: Equation 1-C ($\frac{Vc}{Vt} = 1.111 + 0.044X_1 - 0.305X_2 + 0.029X_2^2$).

Table IV-9) should be given. An equation of the form $Y = a + bX_1 - cX_2 + dX_2^2$ will have a minimum value for Y, and due to the limited range of the sample the minimum in equation 1-C occurs between 4 and 5 United States channels (i.e. $5 < X_2 < 6$). Were Table IV-9 extended to show predicted viewing shares of Canadian television for 6 and 7 United States channels, one would find the expected viewing shares to increase. This is clearly unrealistic. The explanation for this phenomenon arises from the fact that of the 63 observations used to calculate equation 1-C only two had $X_2 > 6$ (i.e. more than 5 United States channels), each time $X_2 = 7$ (i.e. 6 US channels). In spite of three observations of $X_2 > 6$, the data caused a minimum for the function at about 4 United States channels, indicating that additional United States channels past this point will have little or no effect on Canadian viewing time.

To further convince the reader that the upturning of equation 1-C should not be taken seriously, the actual two observations for $X_2 > 6$ are included in parentheses in the appropriate places of Table III-9. The observation with two Canadian and six United States channels is some 19% below the 2-Canadian and 4-United States predicted viewing share, whereas the observation with four Canadian and six United States is only 5% above the 4-Canadian, 6-United States position of the Table.

By analysing Tables IV-8 and IV-9 together one may arrive at the following conclusions:

1) In cases in which there are only one or two United States channels available, the addition of a second and third Canadian channel may be expected to increase Canadian viewing time by probably 5-7%. In other cases (i.e., the addition of successive Canadian channels over 3 with one or two United States channels available, or the addition of Canadian channels over one when there are more than two United States channels available off-air) the marginal Canadian channel will tend to increase total Canadian viewing time by only 3-4%. In other words, the marginal effect of Canadian channels on viewing time tends to be quite constant (3-4%, except in cases where very few Canadian and United States channels are available, in which case it may rise to 5-7%) and this effect is very small. This leads one to believe that most of the audience for the additional Canadian channel will come at the expense of other Canadian channels rather than the United States channels.

2) The impact of additional American channels declines quite rapidly, however, but their negative impact tends to be much greater than the positive impact of Canadian channels for the relevant range of station line-ups. For example, the first United States channel may be expected to cause a drop in Canadian viewing time of 20-25%, the second of 12-15%, the third 9-11%, the fourth of 4-5%. The fifth United States

channel will probably have an impact of 0 to 2%; the functional form used in Table IV-8 probably caused its effect to be over-estimated while Table IV-9 does not accurately portray the results for these number of channels.

3) If the number of Canadian and United States channels that are available are equal in number, Canadian channels may expect to obtain 50-60% of total viewing time, but this share will decline slowly as the number of these channels rises.

The cable television equations, 2-A, 2-B, 2-C are given below.

$$2\text{-A} \quad \frac{Vcc}{Vtc} = \underset{}{0.756} + \underset{(1.748)}{0.022X_3} - \underset{(-6.518)}{0.069X_4} \qquad r^2 = .42$$

where Vcc = total Canadian viewing hours on cable

Vtc = total television viewing hours on cable

X_3 = number of Canadian channels plus one on the cable

X_4 = number of United States channels plus one on the cable.

The coefficients of X_3 and X_4 have the expected signs and are significant at the 95% level.

$$2\text{-B} \quad \text{nlog}\left(\frac{Vcc}{Vtc}\right) = \underset{}{-0.475} + \underset{(2.916)}{0.308}\ \text{nlog}\ X_3 - \underset{(-6.771)}{0.473}\ \text{nlog}X_4 \qquad r^2 = .45$$

Equation 2-B may also be written as:

$$\frac{Vcc}{Vtc} = 0.475X_3^{(.308)}\ X_4^{(-0.473)}$$

$$2\text{-C} \quad \frac{Vcc}{Vtc} = \underset{}{1.037} + \underset{(3.254)}{0.034X_3} - \underset{(-7.295)}{0.245X_4} + \underset{(5.427)}{0.019X_4^2} \qquad r^2 = .62$$

As before, one may make the following conclusions:

(1) The coefficients of X_3, X_4, X_4^2 are all significant at the 95% level of confidence.

(2) The fact that the r^2's of equations 2-B and 2-C are higher than that of 2-A, and that the t-value of X_4^2 is so significant indicates a declining marginal influence of United States channels on Canadian viewing time.

(3) The coefficients of the X_4 terms are greater in all cases than the coefficients of the X_3 terms, indicating that generally the negative impact of successive United States channels is greater than the positive impact of successive Canadian channels.

(4) Equation 2-C gives much the highest r^2 indicating that the interaction effect of the number of Canadian and United States channels may not be as great as previously supposed.

In Tables IV-10 and IV-11 are presented the estimated share of total viewing time for Canadian channels for various combinations of Canadian and United States channels on the cable as derived from equations 2-B and 2-C respectively.

In Table IV-11, the actual observations from the sample data for United States channels of seven and more (i.e., $X_4 \geqslant 8$) are again shown in parentheses. This is again due to the fact that equation 2-C reaches a minimum value of $6 < X_4 < 7$, and there are theoretical reasons for assuming the equation to be inapplicable past this limit. In two cases (United States = 7 and Canadian = 2; United States =

Table IV-10. Estimated Percentage Viewing Time of Canadian Television Channels by Cable Subscribers for Various Combinations of Canadian and United States Channels on Cable

Number of Canadian Channels	Number of United States Channels							
	1	2	3	4	5	6	7	8
1	56	46	40	36	33	31	29	27
2	63	52	45	41	37	35	33	31
3	68	56	50	44	41	38	36	34
4	72	60	52	47	43	40	38	35
5	78	64	56	50	46	43	41	38
6	81	67	59	53	49	45	43	40
7	85	70	61	55	51	47	44	42
8	88	73	63	57	52	49	46	43
9	91	75	65	59	54	50	48	45

Source: Equation 2-B. $(\text{nlog}(\frac{Vcc}{Vtc}) = -0.475 + 0.308 \text{ nlog } X_3 - 0.473 \text{ nlog } X_4)$

Table IV-11. Estimated Percentage Viewing Time of Canadian Television Channels by Cable Subscribers for Various Combinations of Canadian and United States Channels on Cable

Number of Canadian Channels	Number of United States Channels							
	1	2	3	4	5	6	7	8
1	69	54	43	36	32	32		
2	73	58	46	39	35	36	(27)	
3	76	61	50	42	39	39	(41)	(52)
4	79	64	53	46	42	42	(42)	
5	83	68	57	49	46	46		
6	86	71	60	53	49	49		
7	90	75	63	56	52	53		
8	93	78	67	59	56	56		
9	96	81	70	63	59	59		

Source: Equation 2-C $(\frac{Vcc}{Vtc}) = 1.037 + 0.034X_3 - 0.245X_4 + 0.019X_4^2)$.

8 and Canadian = 3), the figures in parentheses represent the simple averaging of two observations which occur at these positions. Of the six observations, only two show an increase from the viewing percentages predicted at six United States channels (both at United States channels = 8, Canadian channels = 3, and each observation gives 52% observed viewing time for Canadian television). Two observations are about equal to the predicted viewing time for Canadian television when 6 United States channels are available (United States = 7, Canadian = 3 and 4). Two observations, averaged under element United States = 7, Canadian = 2 in Table IV-11 show a decrease from the preceding column (the actual observations being $\frac{Vcc}{Vtc}$ = 31 and 22). The average change for the six observations from those of the previous column is less than 1%. Having said this, one may make conclusions from studying Tables IV-10 and IV-11, and with reference to Tables IV-8 and IV-9.

(1) As in Table IV-8, it appears the marginal positive impact of adding Canadian channels when the number of Canadian and United States channels available is small (less than 3 United States and 2 Canadian) is somewhat larger than in all other cases (5 to 7% compared with normally 3.5%). In all other (more normal) situations, the marginal effect of Canadian channels is quite constant and low (3-4%).

(2) The impact of additional American channels again is greater than the effect of additional Canadian channels, but their negative impact tends to decline as successive

United States channels are added. The second United States channel placed on the cable will generally result in a percentage decline of 11-15% in the Canadian audience share, the third will cause a decline of 8-12%, the fourth 4-7%, the fifth 3-5%, the sixth 0-3%. Additional United States channels will probably not cause any significant change in the percentage share of audience to Canadian television. The higher the Canadian audience share before the addition of the marginal United States channel (i.e., the greater the number of Canadian channels) the greater will be the reduction in the Canadian audience share, and this reduction will approach the upper limits set out above.

(3) All other things equal, cable viewers watch Canadian television slightly less than off-air viewers, the general range being 3-6% less. This small difference in the viewing habits of the two groups is surprising for two reasons. In the first place, cable subscribers have expressed a desire for additional television signals through the act of subscribing to CATV. This could be interpreted as an expression of stronger preference for American signals than would normally be attributable to those who had not made this decision. In the second place, cable equalises all channels with regard to picture quality, and one would expect this to have a larger effect on viewing patterns than is apparent from the regressions; it will be remembered, however, that this effect was neutralised to some degree by the guidelines used

in deciding whether or not a given television station was available off-air.[48]

It appears, then, that CATV subscribers prefer Canadian television only slightly less than off-air viewers.

(4) There are no significant differences in the marginal effects of Canadian and United States channels for cable and non-cable viewers on the percentage viewing times to Canadian stations.

(5) In cases where the number of Canadian and American channels carried on the cable are equal, the Canadian viewing share may be expected to range from about 58%-45% of total viewing time, the lower figure applying when the number of channels is large. This, again, is somewhat lower than would apply to off-air viewers.

(6) For each functional form, the r^2's for the CATV equations are significantly lower than the corresponding r^2's for the off-air equations. The r^2, for example, of equation 2-C is .62 while that for equation 1-C is .73. The higher unexplained variation in the viewing patterns of cable subscribers is significant when one recalls that the two sample populations were chosen from identical counties and metropolitan areas. One should recall also that the best estimates of viewing patterns of cable and non-cable viewers were identical, except that the former tended to watch Canadian

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[48]Since stations with up to 10% off-air share of audience were declared to be unavailable if their cable share more than doubled.

television 3-6% less than the latter. While one may predict identical viewing patterns between these two groups (after allowing for the 3-6% divergence), the cable predictions should be treated with less confidence when being applied to particular populations.

The most likely explanation for the phenomena described above is that while cable subscribers do not show a significantly greater preference for United States television as such (only 3 to 6% more), they do show greater discrimination in the programmes they watch. The relative time they watch Canadian television will depend not only on the number of Canadian and United States channels available, but also their "qualities" to a much greater degree than for off-air viewers.

The fact that the regressions for cable and non-cable populations were so similar indicates that by and large the "quality" differences were neutralised over the whole sample (i.e., "good" and "bad" Canadian channels neutralised one another, as did the United States channels). The phenomenon showed upon the r^2, however. No attempt was made, however, to take account of differing qualities of stations.

The study turns now from an analysis of viewing patterns regarding the Canadian broadcasting system as a whole to a study of viewing patterns with regard to individual stations. From this it will be possible to assess CATV's financial impact on broadcasters.

Separate regressions were run for CBC network stations and CTV stations. Regressions were run for cable and non-cable viewers selected from the same geographical entity. The same three functional forms were tried; in order to avoid clutter, however, only the functional form giving the highest r^2 appears in the text with the others given in the footnotes.

In order to ensure that the test station in each case was a local station, the county or municipality in which the station is located was often used. When other counties or municipalities were used, after checking maps and the ratings of the station among off-air viewers, the excellence of the television signal in the area was confirmed.

Since the primary purpose of the exercise was to see how CATV's importation of American channels affects local television stations, predominantly French speaking population areas and French television stations were not included in the sample. For the remaining television stations, generally two and occasionally one and three sample populations were used. The final sample size for CTV stations was 22 population areas and for the CBC 38 such areas.

Four variables were regressed on the percentage viewing share of the local station:

(a) The number of Canadian alternates available, over and above the test station. CBC and CTV provide clear alternatives, as does the independent CHCH in Hamilton. Where a French station achieved a significant audience share,

it was included as a Canadian alternate.

(b) The number of Canadian duplicates available. This is the total number of Canadian channels receivable less the number of Canadian alternates.

(c) The number of United States alternates available. This variable denotes the number of United States networks and independent stations receivable in the area.

(d) The number of United States duplicates available. This is the total number of United States channels receivable less the number of United States alternates.

The same standards for judging the availability of channels were used as before.

Equation (3-CBC) shows the estimated impact various combinations of Canadian and American alternate and duplicate channels off-air will have on a CBC station's off-air viewing share.

$$(3\text{-CBC}). \quad \text{nlog}\left(\frac{V_1}{V_3}\right) = \underset{}{0.084} - \underset{(-4.654)}{0.564}\text{nlog}X_1 - \underset{(-3.004)}{0.351}\text{nlog}X_2 - \underset{(-6.037)}{0.623}\text{nlog}X_3 - \underset{(-0.881)}{0.132}\text{nlog}X_4 \qquad r^2 = .75.$$

Alternate functional forms for these variables are given below.[49]

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[49]The simple linear regression of CBC off-air viewing shares on X_i is:

$$(a)\frac{V_1}{V_3} = \underset{}{1.250} - \underset{(-4.657)}{0.1697}X_1 - \underset{(-2.259)}{0.0679}X_2 - \underset{(-5.821)}{0.1368}X_3 + \underset{(0.151)}{0.006}X_4 \qquad r^2 = .71.$$

while the simple regression including the squared terms is:

The variables in equation 3-CBC are:

V_1 = off-air viewing hours of the test station during the survey week.

V_3 = total off-air viewing hours of the surveyed population during the survey week.

X_1 = the number of Canadian alternate channels available off-air in addition to the test station.

(b) $\frac{V_1}{V_3} = 1.674 - \underset{(-2.010)}{0.471X_1} - \underset{(-2.024)}{0.212X_2} - \underset{(-1.126)}{0.1198X_3} - \underset{(-0.276)}{0.065X_4} +$

$$\underset{(1.326)}{0.084X_1^2} + \underset{(1.365)}{0.028X_2^2} - \underset{(-0.203)}{0.004X_3^2} + \underset{(0.299)}{0.015X_4^2}$$

$r^2 = .75.$

In equation (a) the coefficient of X_4 has the wrong sign, but is not significant at the 95% level. The other variables have the expected sign and are significant at the 95% level. In equation (b), only the coefficients of X_1 and X_2 are significant at the 95% level, while those of X_1^2 and X_2^2 are significant at the 87.5% level. None of the other variables are significant at the 87.5% level. However, only the coefficient of X_3^2 has the unexpected sign. A positive sign for the squared variables (which a priori reasoning would lead one to expect) would indicate a declining marginal impact of adding channels.

When equation (b) was rerun, dropping the X_3^2 term, the following results were obtained:

(c) $\frac{V_1}{V_3} = 1.675 - \underset{(-2.039)}{0.462X_1} - \underset{(-2.053)}{0.211X_2} - \underset{(-5.622)}{0.141X_3} - \underset{(-0.023)}{0.052X_4} +$

$$\underset{(1.333)}{0.082X_1^2} + \underset{(1.382)}{0.028X_2^2} + \underset{(0.252)}{0.012X_4^2}$$

$r^2 = .75.$

It is immediately apparent that the dropping of the X_3^2 term causes the coefficient of X_3 to become highly significant ($t = -5.622$) without appreciably changing the coefficient or disturbing the r^2

X_2 = number of Canadian duplicates available off-air plus one.

X_3 = number of United States alternate channels available off-air plus one.

X_4 = number of United States duplicates available off-air plus one.

In equation 3-CBC all the coefficients have the expected negative sign (i.e., each additional channel of any category will cause a decline in the viewer share of the local station). The only coefficient that is not significant at the 95% level is that of the $\text{nlog}X_4$ term.

The number of United States alternates has the highest t-value and the largest coefficient, followed closely by the number of Canadian alternates and then the number of Canadian duplicates. These observations do not hold entirely for the equations in footnote 48, however.

Equation 4-CBC shows the estimated impact differing combinations of channels carried on cable will have on a local CBC station's share of the cable television audience.

$$4\text{-CBC.}\quad \frac{V_2}{V4} = \underset{}{0.783} + \underset{(0.381)}{0.0697X_5} - \underset{(-2.299)}{0.214X_6} - \underset{(-0.935)}{0.076X_7} + \underset{(0.333)}{0.032X_8} -$$

$$\underset{(-0.459)}{0.0209X_5^2} + \underset{(1.669)}{0.028X_6^2} - \underset{(-0.071)}{0.001X_7^2} - \underset{(-0.296)}{0.004X_8^2}$$

$$r^2 = .51.$$

where V_2 = local station's total viewing hours on cable in the population area for the survey week.

V_4 = total television viewing time by cable subscribers in the area of the survey week.

X_5 = number of Canadian alternates carried on the cable plus one.

X_6 = number of Canadian duplicates carried on the cable plus one.

X_7 = number of United States alternates carried on the cable plus one.

X_8 = number of United States duplicates carried on the cable plus one.

Other functional relationships among these variables are given in the footnotes.[50]

In equation 4-CBC, only coefficients of X_6 and X_6^2 are significant (that of X_6^2 being right at the border of significance) at the 95% level. Both have the expected sign, indicating that duplicate channels have a large impact on

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[50] The simple regression of CBC cable viewing shares on X_i is:

(a) $\frac{V_2}{V_4} = 0.698 + \underset{(0.005)}{0.0002X_5} - \underset{(-2.947)}{0.059X_6} - \underset{(-3.452)}{0.076X_7} - \underset{(-0.224)}{0.0049X_8}$

$r^2 = .45$

Only the coefficients of X_6 and X_7 (the number of Canadian duplicates and United States alternates) are significant at the 95% level. The coefficient of X_5, the number of Canadian alternates is for all intents and purposes zero, indicating that CTV network stations do not detract from the viewing of CBC stations. The coefficient of X_8 has the expected sign, although it is not significant.

The Cobb-Douglas function is:

(b) $n\log\left(\frac{V_2}{V_4}\right) = -0.249 - \underset{(-0.042)}{0.011n\log X_5} - \underset{(-3.089)}{0.636n\log X_6} - \underset{(-2.713)}{0.668n\log X_7}$

$+ \underset{(0.191)}{0.043n\log X_8}$ $\quad r^2 = .37.$

Here again, only the coefficients of X_6 and X_7 are significant, while that of X_8 now has the wrong sign. Once more, the coefficient of X_5 approaches zero.

the audience of a local station but the marginal influence declines rapidly as successive duplicate channels are added to the cable.

As in equation (b) of footnote 48, the coefficient of the square of the number of American alternates (here, X_7^2; in footnote 48, X_3^2) has the unexpected negative sign, although again it is not significant at the 95% level of confidence. Once again, however, it has reduced the t-value of the coefficient of the variable X_7 (in equation (b) of footnote 48, X_3) to such a degree that the coefficient becomes not significant--compare t value of -0.935 in equation 4-CBC to -3.452 in equation (a) of footnote 49. One might conclude, then, that the number of United States alternates (networks plus independent stations) does not seem to have a decreasing impact on the audience of a local station as the number of these alternates increases, at least up to 4 or 5 such American alternates. Canadian broadcasting may be very fortunate that there are only three United States networks.

The coefficient of X_5, the number of Canadian alternates, has the wrong sign, as does X_5^2, but neither are significant. When X_5^2 is dropped, as in equation (a) of footnote 49, the coefficient of X_5 approaches zero. This is strong evidence that CTV stations generally have little or no effect on the viewing share of local CBC stations. It appears that viewers do not consider CTV a substitute for

the CBC and CTV's audience is derived almost in whole from what would otherwise have gone to the Americans. This is intuitively not as disturbing a finding as one would at first glance believe. CTV has long concentrated on importation of United States programmes, and in 1970 had a schedule of Canadian programmes of only 2 1/2 hours per week.[51] A good proportion of its Canadian content is designed for foreign (United States) sales and is therefore not concerned with Canadian matters.

Once again, the r^2's for the cable equations are well below those for the off-air population.

One further set of equations should now be presented, which attempt to predict the positive impact of CATV.

CATV extends the reception range of Canadian as well as American stations, and therefore stations may expect to gain an audience in distant centres via cable, whereas without cable such audience would be nil in these areas.

It was only possible to find a sample of 11 counties and metropolitan centres for which a distant Canadian t.v.

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[51]CTV's winter prime-time (7-11 p.m.) schedule for 1969-70 gave the following number of hours/week of programming by country of origin:

United States	20 1/2 hrs
United Kingdom	3
Canada	2 1/2
hockey	2
	28 hours

Source: Woods Gordon and Company. CTV Television Network Ltd. Financial Outlook for the Network (Toronto, March, 1971, p. 40.

station had almost zero off-air audience but gained at least 3 to 4% of the CATV viewing time. Equation 5 presents the results for this sample of 11, which includes both CBC and CTV stations. In every case (and this was the intent of the sample), there is a local television station of the same affiliation as the one being imported.

$$5.\ \text{nlog}\left(\frac{V_2}{V_4}\right) = \underset{(-1.266)}{-1.672 - 2.592\text{nlog}X_5} + \underset{(0.326)}{0.307\text{nlog}X_6} + \underset{(0.456)}{0.450\text{nlog}X_7} + \underset{(0.080)}{0.050\text{nlog}X_8}$$

$$r^2 = .19.$$

The coefficient of X_5 is almost significant at the 87.5% level of confidence, and has the expected sign. None of the other coefficients have the correct sign nor are they significant. The very low r^2 means one cannot predict a station's distant audience based on equation (5) very well. Other factors, such as the "quality" of the signal being imported appear to be much more important.

Next, equations (3-CBC) and (4-CBC) are integrated into a single equation (6) which predicts the impact CATV has on the total audience of a CBC television station.

Let V represent the total number of weekly viewing hours attained by a given television station. V is composed of both off-air and cable viewing hours so that:

$V = V_1 + V_2$ where V_1 and V_2 are as defined above.

Let H represent the number of households within the station's grade-B contour, H_1 the number of households within this contour without cable and H_2 the number of cable households.

$H = H_1 + H_2$

If v_1 represents the average number of hours per week spent watching the local station by each off-air viewer within the grade-B contour of the station, and v_2 represents the same for cable viewers within the grade-B, and if $\bar{a}$ represents the average number of people per household, then

$V_1 = v_1 \cdot H_1 \cdot \bar{a}$

$V_2 = v_2 \cdot H_2 \cdot \bar{a}$

Represent a hypothetical variable, which is total weekly viewing-hours of the local station if cable were taken away, by $\hat{V}$.

Generally, $\hat{V} > V = V_1 + V_2$. This is due to the fact that H_2 households have now lost cable television, and one would expect them to view the local station more than V_2. H_1 will not change viewing habits.

Now make two diametrically opposed assumptions. Assume first that the removal of cable causes H_2 to adopt H_1 viewing habits. In this case the extra television viewing time of the cable subscribers, over that of off-air viewers, is attributable entirely to the increased choice and clarity of television signals brought to the viewers by CATV. These former cable viewers in total now will watch the local station $v_1 \cdot H_2 \cdot \bar{a}$ hours/week.

We now have

6. $\hat{V} - V = \Delta \hat{V} = v_1 \cdot H_2 \cdot \bar{a} - v_2 \cdot H_2 \cdot \bar{a}$

However, if cable households simply watch more t.v. in any case, i.e., cable t.v. is a selector of people who choose

to watch television more than other viewers independent of CATV, then v_1 gives too small a correction and the new ΔV is:

$$7. \quad \Delta \hat{V} = v_1 \cdot H_2 \cdot \bar{a} \cdot \frac{w_1}{w_2} - v_2 \cdot H_2 \cdot \bar{a}$$

where w_2 = total weekly television hours per viewer by cable subscribers

w_1 = total weekly television hours per viewer by off-air viewers.

Substituting $v_1 = \frac{V_1}{H_1 \cdot \bar{a}}$ and $v_2 = \frac{V_2}{H_2 \cdot \bar{a}}$ into equation 6 we get:

$$8. \quad \Delta \hat{V} = V_1 \cdot \frac{H_2}{H_1} - V_2$$

$$\text{or} \quad \Delta \hat{V} = \frac{V_1}{V_3} \cdot V_3 \cdot \frac{H_2}{H_1} - \frac{V_2}{V_4} \cdot V_4$$

Now, $V_3 = w_1 \cdot H_1 \cdot \bar{a}$ and since by assumption $w_1 = w_2$,

$V_4 = w_1 \cdot H_2 \cdot \bar{a}$.

$$9. \text{ Therefore, } \Delta V = \left[\frac{V_1}{V_3} - \frac{V_2}{V_4}\right] \cdot (w_1 \cdot \bar{a} \cdot H_2)$$

And, substituting equations 3-CBC and 4-CBC into equation 9, we get finally:

$$10. \quad \Delta \hat{V} = [0.084X_1^{-0.56} X_2^{-0.35} X_3^{-0.62} X_4^{-0.13} - (0.78 + 0.07X_5 - 0.21X_6 - 0.08X_7 + 0.03X_8 - 0.02X_5^2 + 0.03X_6^2)] \cdot w_1 \cdot \bar{a} \cdot H_2.$$

Equation 10 gives the best estimate of the increase in viewing hours a typical CBC station may be expected to obtain were CATV banished from its grade-B contour--and by implication, the decline in viewing hours attributable to the presence of CATV--for any combination of channels receivable off-air and on cable.

Equation 10 may easily be complicated by allowing for the positive influence of CATV on a station's audience by exporting its signal into areas outside the station's grade-B contour. However, the r^2 of equation 5 is so low and the distant audience is actually worth so little to television stations that this has not been done (see footnote 2 in this chapter).

By substituting into equation 7, which assumes that cable subscribers watch more television simply because they are t.v. lovers, and not because of the effects of cable, equation 11 is developed, which is an alternative to 10:

$$11.\quad \Delta \hat{V} = [0.084X_1^{-0.56} X_2^{-0.35} X_3^{-0.62} X_4^{-0.13}] \cdot w_1 \cdot \bar{a} \cdot \frac{w_1}{w_2} - [0.78 + 0.07 X_5 - 0.21X_6 - 0.08X_7 + 0.03X_8 - 0.02X_5^2 + 0.03X_6^2] \cdot w_2 \cdot H_2 \cdot \bar{a}.$$

Table IV-12 gives the estimated audience loss faced by a CBC television station due to the presence of CATV for some typical situations, together with the estimated share of audience for this station among both off-air and cable viewers.

The parameter $\bar{a}$ was calculated to be 2.7, reflecting the national average in 1966 of persons over 14 years of age per household.[52] The parameter w_1 was taken to be 23.5

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[52]Dominion Bureau of Statistics. Canada Yearbook 1969 (Ottawa: Queen's Printer), 1970, pp. 183-4.

Table IV-12. Change in Audience of Typical CBC Station with Introduction of CATV, Together with Station's Estimated Cable and Non-Cable Audience Shares.

	(1) Channels Off-Air				(2) Channels On Cable				(3) Off-Air Viewing Share (%)	(4) CATV Viewing Share (%)	(5) $\hat{\Delta V}$, Audience Loss (Gain) Due to CATV	(6) $\hat{\Delta V}$, Prime-Time Audience Loss (Gain) Due to CATV
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8				
(1)	2	1	1	1	2	1	1	1	73.5	60.4	8.32H_2hrs/wk	6.91H_2hrs/wk
(2)	2	1	2	1	2	1	2	1	47.8	52.5	(2.98H_2hrs/wk)	(2.67H_2hrs/wk)
(3)	3	2	2	1	3	2	2	1	29.8	36.0	(3.94H_2hrs/wk)	(3.27H_2hrs/wk)
(4)	2	2	1	1	2	2	1	1	57.7	45.4	7.81H_2hrs/wk	6.48H2hrs/wk)
(5)	2	2	4	2	2	2	4	2	22.2	25.1	(1.84H_2hrs/wk)	(1.53H_2hrs/wk)
(6)	3	3	4	3	3	3	4	3	14.9	15.4	(0.32H_2hrs/wk)	(0.27H_2hrs/wk)
(7)	3	4	4	4	3	4	4	4	17.6	14.0	2.29H_2hrs/wk	1.90H_2hrs/wk
(8)	2	2	1	1	3	2	2	1	57.7	36.0	13.78H_2hrs/wk	11.44H_2hrs/wk
(9)	2	1	2	1	3	3	4	3	47.8	15.4	20.57H_2hrs/wk	17.07H_2hrs/wk
(10)	3	2	2	1	3	4	4	4	29.8	14.0	10.03H_2hrs/wk	8.32H_2hrs/wk
(11)	2	2	1	1	3	4	4	4	57.7	14.0	27.75H_2hrs/wk	23.03H_2hrs/wk
(12)	2	1	1	1	3	4	4	4	73.5	14.0	37.78H_2hrs/wk	31.36H_2hrs/wk

Source: Equation 10.

hours/week.[53] A second parameters, w_3 = 19.5 hrs/week was used to estimate average weekly prime-time viewing hours (prime-time is 7-11 p.m.) and calculations in column (6) show the estimated change in prime-time audience due to cable.

Once again, the X_i in Table IV-12 represent one more than the number of channels of various types that are available. The first seven rows of Table IV-12 give identical channel availability for off-air and CATV viewers, while rows (8) to (12) show the effects of increased channel availabilities on CATV over that off-air upon a CBC station's audience.

Row (1), which estimates the audience for a local station when one Canadian alternative (a CTV station) is available only, may over-estimate the audience loss due to cable. No cable systems carrying only two Canadian channels were included in the sample and so this sort of extrapolation may be unreliable.

Similarly, row (4), which estimates viewing shares when one Canadian alternative and one Canadian duplicate channel are available, is atypical, and the drop of some 12% in cable viewing time may be too large.

Apart from rows (1) and (4), Table IV-12 shows that in cases in which CATV only serves to strengthen signals that are already available off-air, without adding more distant signals, the audience share of a local CBC station should

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[53] CBC Research Study, TV/69/56, op. cit., p. 1.

not be expected to drop off significantly for CATV subscribers as compared to off-air viewers. In general, the audience share of cable subscribers will differ by only 4 to 5% from the off-air audience and the former is as likely to be greater as it is smaller than the latter.

This finding is highly significant. It reinforces the previous conclusion that cable television subscribers do not have greatly differing viewing habits from conventional viewers, and that they apparently do not exhibit,through the act of subscribing to CATV, any greater dissatisfaction with their local television stations. These results indicate also that the only danger inherent in CATV vis à vis the Canadian broadcasting system is through the ability of cable t.v. to increase channel availability. This is not meant to minimise this danger, of course, but it bears emphasising that CATV does not appear to change viewing habits by itself.

These similarities in viewing habits of the two groups of viewers is very important for the longer range survivability of Canadian broadcasting. Fear has been expressed that Canadians would become more and more addicted to United States television because of the latter's expensive mass-appeal type programming. It had been forecast that by placing such foreign channels on cable, thereby equalising the qualities of the United States and Canadian signals, Canadians would begin to shift their preferences towards these more expensive, lighter, television programmes. Table IV-12 suggests no such trend.

The fact that the r^2's for the viewing equations of cable subscribers are significantly lower than the r^2's for the off-air equations indicates that the "quality" of the local station is a more important factor in determining its over-all audience for cable t.v. viewers than other viewers.

The concern expressed by the CRTC, broadcasters and observers of Canadian broadcasting over the deliterious effects of CATV on audiences for local stations is shown to be well-founded by rows (8) to (12) of Table IV-12. This part of the Table gives the estimated loss in viewer hours for stations when CATV is allowed to bring in distant signals that are unattainable off-the-air.

For example, row (8) shows that when 1 Canadian alternate and 1 Canadian duplicate channel are available off-air and CATV imports an additional Canadian alternate and one United States signal, the percentage viewing time attained by the local station on cable may be expected to be some 20% less than its off-air share (36.0% compared to 57.7%). This represents a total loss in viewing hours per cable household per week of 13.8 hours, or in total 13.8 H_2 hours, and 11.4 H_2 prime-time hours.

If, as in row (12), one Canadian alternate is available off-air while CATV carries two Canadian alternates, three Canadian duplicates, three United States alternates and three United States duplicates, the viewing shares are 73.5%

and 14.0%, representing a total loss in viewer-hours of 37.8 H_2 hours per week.

The magnitude of these declines in viewer-hours is very large. The public policy implications of these results will be studied after the CTV equations have been presented.

Equation 3-CTV below explains the variation in a local CTV station's audience share by the availability of off-air signals.

$$3\text{-CTV.}\quad \frac{V_1}{V_3} = 0.321 + \underset{(0.861)}{0.115X_1} + \underset{(0.246)}{0.061X_2} - \underset{(-2.434)}{0.127X_3} - \underset{(-0.087)}{0.012X_4} \qquad r^2 = .39.$$

An alternate functional form is given below.[54]

In equation 3-CTV, the coefficient of the X_3 term is significant at the 95% level of confidence. The coefficients of the X_1 and X_2 terms have the unexpected positive sign; the remaining coefficient have the expected signs.

Equation 4-CTV shows the variation in the viewing shares of local CTV stations explained by CATV channel availabilities.

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[54] (a) $\text{nlog}\frac{V_1}{V_3} = -1.391 + \underset{(0.913)}{0.733\ \text{nlog}X_1} + \underset{(1.560)}{0.395\text{nlog}X_2} - \underset{(-2.403)}{0.662\ \text{nlog}X_3} - \underset{(-0.371}{0.209\text{nlog}X_4}$

$r^2 = .34$

In equation (a) the coefficient of $\text{nlog}X_3$ is significant at the 95% level; the other coefficients are not. The coefficients of $\text{nlog}X_1$ and $\text{nlog}X_2$ have an unexpected positive sign.

$$4\text{-CTV.}\quad \frac{V_2}{V_4} = \underset{}{2.871} \underset{(-2.665)}{- 1.715X_5} \underset{(3.823)}{+ 0.421X_6} \underset{(-4.400)}{- 0.317X_7} -$$

$$\underset{(-0.858)}{0.153X_8} + \underset{(2.508)}{0.323X_5^2} \underset{(-3.258)}{- 0.070X_6^2} + \underset{(1.809)}{0.023X_7^2} +$$

$$\underset{(0.572)}{0.029X_8^2} \qquad r^2 = .91.$$

Again, alternate functional forms for the cable viewing regressions are given below.[55]

In equation 4-CTV all but the coefficients of X_8 and X_8^2 are significant at the 95% level of confidence. The coefficient of X_6 (the variable representing the number of Canadian duplicate channels) is positive, which is contrary to *a priori* reasoning and is highly significant, although this positive influence on local CTV viewing time is counteracted somewhat by the negative coefficient of X_6^2, which is, incidentally, also highly significant.

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[55] (a) $\frac{V_2}{V_4} = \underset{}{0.889} \underset{(0.887)}{- 0.074X_5} \underset{(1.072)}{+ 0.042X_6} \underset{(-6.462)}{- 0.145X_7} \underset{(-0.485)}{- 0.020X_8}$

$r^2 = .79$

(b) $\text{nlog}\frac{V_2}{V_4} = \underset{}{0.703} \underset{(-2.237)}{- 1.458\text{nlog}X_5} \underset{(2.918)}{+ 0.892\text{nlog}X_6} -$

$\underset{(-6.356)}{1.285\text{nlog}X_7} \underset{(-0.899)}{- 0.216\text{nlog}X_8} \qquad r^2 = .75$

Of the variables in equation (a), only the coefficient of the X_7 term is significant at the 95% level. Again, the coefficient of the X_6 term has the opposite sign to that which would be expected *a priori*.

In equation (b), only the coefficient of the X_8 term is not significant at the 95% level; once more, the coefficient of X_6 has the unexpected positive sign and is this time significant at the 95% level of confidence.

Why do the number of Canadian duplicate channels apparently raise the relative viewing time of a CTV station? At the time of the audience survey from which these equations were run (late 1969) there were but eleven CTV network stations in Canada.[56] Such stations are then regional in character. In only one area are two CTV affiliates in such geographic proximity that a cable system is able to duplicate the local CTV station (CKCO in Kitchener, CFTO in Toronto).[57] For all intents and purposes, then, the variable X_6 in equation 4-CTV represents the number of CBC affiliated stations that may be received. CBC affiliates are much more local in character than CTV affiliates and often face extensive duplication on cable.

The number of duplicate CBC stations that a CATV system can import (without the aid of microwave) probably correlates well with both the regional population density of the CTV

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[56]Canadian Radio-Television Commission. CRTC Annual Report 1968-69 (Ottawa), 1969, p. 5. This is subject to change in the near future. The CRTC is requiring CTV to extend its coverage area in Canada by means of re-broadcasting stations; this may have the effect of increasing the amount of duplication of CTV stations' service, in which case the number of Canadian duplicates will probably correlate positively with a decreasing expected audience share for a local CTV station. See CRTC Public Announcement, March 10, 1972. As of March, 1972, there were 14 CTV affiliates.

[57]The only English language independent station in Canada, CHCH in Hamilton, was treated as an alternative to CTV in the regressions, but its own audience--number of channels data was included in the CTV sample. Its coverage area also overlaps those of CFTO and CKCO.

station's locale and with that region's economic well-being. In lesser populated areas, and in poorer areas, one would expect to find fewer television stations (and more rebroadcasting stations) than in closely populated, richer areas. This means that the largest and wealthiest of the CTV affiliates are to be found in areas in which the number of duplicate Canadian channels (i.e., CBC affiliates) is relatively high, whereas the smaller CTV stations are located in areas served by fewer CBC affiliates. If larger, wealthier CTV affiliates are able to retain their audiences better than the smaller ones, then the apparent anomaly in connection with the positive coefficient of the X_6 term is explained.[58] There is, of course, no causal relationship between the number of CBC affiliates available and the increase in the CTV stations' audience, but this relationship remains useful for prediction purposes.

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[58]The CBC reports that CTV stations generally lose more of their audience as a result of cable penetration than CBC-owned and operated stations (but relatively less than CBC private affiliates). And the greater audience loss by CTV than the CBC-owned stations is most pronounced in those major population centres in which both CBC and CTV stations are located. See CBC Research Report TV/69/74, op. cit., p. 5. However, this greater audience holding power of CBC-owned stations in the face of United States competition gives no indication of the relative holding power of large vs. small CTV stations.

In an effort to test this latter point, Table IV-13 (continuation of this footnote on the following page) gives the audience shares attained by six CTV affiliates on cable. The stations are listed in roughly descending order of their size, and are accompanied by the competition they face on CATV.

There is a second facet to the CTV equations that deserves explanation. The regressions of CTV viewing time on channel availabilities for CATV audiences give much higher r^2's than do the regressions for off-air viewing (r^2 = .91 for cable audiences; r^2 = .39 for off-air audiences). This contradicts the pattern developed earlier.

Once again, the explanation of this phenomenon probably lies in the regional nature of CTV stations. Whereas top quality pictures are available for CBC stations from a local television outlet for almost every major population centre in the country, the same is not true for CTV outlets, and

Table IV-13. Percent of Audience Captured by Six CTV Affiliates on Cable and Amount of Competition Faced

Station	Sample Population Area	Captured Audience (%)	Number Can. Competitors on Cable	Number U.S. Competitors on Cable
CFTO	Oshawa	20.5	4	4
CHAN	Vancouver	19.7	2	5
CJOH	Stormont county	15.6	5	4
CJAY	County No. 601	33.9	1	1
CFCN	Lethbridge	24.1	1	2
CKCW	Charlotte	5.7	1	3

Source: BBM survey Oct. 27-Nov. 9, 1969.

An examination of the above Table should convince the reader of the reasonableness of the hypothesis.

other audiences without cable will have to make do with a poorer picture in order to watch CTV. Such variations in picture quality are not accounted for satisfactorily in equation 3-CTV, and may show up in the lower r^2; such variations are automatically removed for cable equation 4-CTV and thereby result in a higher r^2.

One may only guess, however, why the r^2 of .91 for CTV's cable share is so much higher than the r^2 both for CBC's off-air and cable audience (which are .75 and .51 respectively). One possible explanation is that CBC stations show a much larger range in performance than CTV stations. This is intuitively appealing since CBC stations are composed of both the publicly owned stations, whose performance tends to be much higher,[59] and privately-owned affiliates, whereas CTV affiliates are all privately owned and operated. However, even within the CTV group, one must expect a range of performances as one move from large to smaller stations.

Having attempted an explanation of certain anomalies contained in the CTV regressions, it is now convenient to analyse Table IV-14 below, which shows, for various combinations of signals available off-air and via cable, the estimated proportion of off-air and cable audiences a CTV affiliate may expect to gain, together with the estimated loss in viewer hours attributable to cable.

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[59]See the beginning of footnote 57.

Table IV-14. Change in Audience of a Typical CTV Station with Introduction of CATV, Together with Station's Estimated Cable and Non-Cable Audience Shares

	(1) Channels Off-Air				(2) Channels On Cable				(3) Off-Air Viewing Share (%)	(4) CATV Viewing Share (%)	(5) V; Audience Loss (Gain) Due to Cable	(6) V; Prime-Time Audience Loss (Gain) Due to CATV
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8				
(1)	2	1	1	1	2	1	1	1	47.3	66.6	(12.26H_2hrs/wk)	(10.18H_2hrs/wk)
(2)	2	1	2	1	2	1	2	1	34.6	35.5	(0.57H_2hrs/wk)	(0.47H_2hrs/wk)
(3)	3	2	2	1	3	2	2	1	52.2	48.3	2.48H_2hrs/wk	2.06H_2hrs/wk
(4)	2	2	1	1	2	2	1	1	53.4	87.7	(21.78H_2hrs/wk)	(18.08H_2hrs/wk)
(5)	2	2	4	2	2	2	4	2	14.1	20.5	(10.41H_2hrs/wk)	(8.64H_2hrs/wk)
(6)	3	3	4	3	3	3	4	3	30.5	26.8	2.35H_2hrs/wk	1.95H_2hrs/wk
(7)	3	4	4	4	3	4	4	4	35.4	24.9	6.67H_2hrs/wk	5.73H_2hrs/wk
(8)	2	2	1	1	3	2	2	1	53.4	48.3	3.24H_2hrs/wk	2.69H_2hrs/wk
(9)	2	1	2	1	3	3	4	3	34.6	26.8	4.95H_2hrs/wk	4.11H_2hrs/wk
(10)	3	2	2	1	3	4	4	4	52.1	24.9	17.27H_2hrs/wk	14.33H_2hrs/wk
(11)	2	2	1	1	3	4	4	4	53.4	24.9	18.10H_2hrs/wk	15.02H_2hrs/wk
(12)	2	1	1	1	3	4	4	4	47.3	24.9	14.22H_2hrs/wk	11.80H_2hrs/wk

Source: Equations 3-CTV, 4-CTV, 9.

While examining Table IV-14 the reader should recall that regression equation 3-CTV gave a positive influence on CTV viewing-time by the number of CBC stations for off-air viewers. Also, this regression had a low r^2, which means that in reality there are probably quite significant deviations from the viewing shares, listed in column three. However, the figures listed in column three appear to be quite reasonable.

In column four, which shows the expected audience shares among CATV subscribers, there is one estimation which seems unreasonable, and this occurs in row four. It is improbable that a CTV affiliate would obtain 87.7% of total viewing time when competing with two other CBC channels on cable. The reason that equation 4-CTV failed to perform well in this instance is due to the fact that cable systems seldom, if ever, in practice carry only three Canadian channels and no United States channels, and such backward extrapolation has led to a large error. The remainder of column four appears quite reasonable and the high r^2 of .91 means it should be quite reliable.

Table IV-14 shows that when at least one United States signal is available off-air, and when the CATV system carries the same number and types of channels as are available off-air (rows (2), (3), (5), (6), (7)), the CTV station may experience a slight decline in its viewing share, due to the increased clarity of the American signals. Rows (1) and (4)

indicate „ however, that in cases in which no United States signal is available off-air or on the cable, the CTV share may rise due to CATV. While the reservations mentioned above for the element in column (4) row (4) also hold for column (4) row (1), one may expect that, while the increases in the cable viewing shares may be inflated, they do reflect a tendency. This would be due, again, to the local character of the CBC stations and the more regional character of the CTV stations. Cable thus serves in many instances to improve the picture quality of CTV stations while CBC stations are usually located in the near vicinity anyway.

Again, when CATV imports distant American signals that are otherwise not available, the CTV station suffers significantly.

When Tables IV-12 and IV-14 are studied together, some interesting conclusions may be reached. However, first a difficulty should be admitted.

Obviously, total viewing shares of a CBC affiliate and a CTV affiliate can never reach more than 100% when both are receivable in an area. However, the first row of these two tables indicates that when only two off-air signals are receivable, the CBC station will attain 73.5% and the CTV affiliate 47.3% of total viewing time, which sums to over 100%. The same holds for the cable audience. And again in row (4) of the two tables where again no United States signals are available, one notices this type of result. Once more, it is necessary to stress that the regressions extrapolate poorly

in cases where no United States signals are available.

It is possible to partially test the reliability of Tables IV-12 and IV-14 however for cases in which one or more United States signals are available off-air and via cable. By summing columns (3) of the two tables and also summing columns (4) for cases in which at least 1 United States signal is available (rows (2), (3), (5), (6), (7)), the proportion of total viewing time devoted to the two primary Canadian stations in each area is found. This may be correlated with the total number of Canadian and United States channels available, and these results compared to those contained in Tables IV-9 and IV-11. This exercise is carried out in Table IV-15.

Table IV-15 is quite favourable to the regressions and tables therefrom derived. Columns three and four diverge by 7% in row (1) which indicates that a downward adjustment of 3-4% to the first two elements of column (3) and an upward adjustment of 3-4% of the first two elements of column (4) may be needed. Once this is done, these columns mutually reinforce the levels of confidence one may place in them.

There is a somewhat larger discrepancy between columns (7) and (8) of Table IV-15; however this discrepancy is not so large as to be of real concern. Row (1) shows a difference of 15% between columns (7) and (8); an upward adjustment of 7% to the first element of column (8) and a downward adjustment of 7% to the first element of column (7) would

Table IV-15. Comparison of Results from Different Regressions

(1) No. of Canadian Channels Off-Air	(2) No. U.S. Channels Off-Air	(3) From Tables IV-12 and IV-14 Total % Can. Viewing of CBC & CTV Primary Stations	(4) From Table IV-9 Total % Can. Viewing Time All Can. Channels	(5) No. Canadian Channels -Cable	(6) No. U.S. Channels -Cable	(7) From Tables IV-12 & IV-13 Total % Can. Viewing CBC & CTV Primary Stations	(8) From Table IV-11. Total % Can. Viewing Time--All Canadian Channels
(1) 2	1	82	75	2	1	88	73
(2) 4	1	82	84	4	1	84	79
(3) 3	4	36	49	3	4	46	42
(4) 5	5	45	59	5	5	42	46
(5) 6	6	53	63	6	6	40	49

Source: Tables IV-9, IV-11, IV-12, IV-13.

appear to be reasonable. Similarly, an adjustment of 5-6% maximum may be required for other elements in columns (7) and (8).

In summary, then, the off-air regressions 1-C, 3-CBC and 3-CTV appear to give results consistent to within ± 4% for cases in which at least one United States signal is available, and the cable regressions 2-C, 4-CBC, 4-CTV give results consistent to within ± 7% for cases in which at least one United States channel is carried by the CATV system. While the sample populations used in regressions 1-C and 2-C, and in 3-CBC and 4-CBC, and in 3-CTV and 4-CTV were chosen from identical geographical entities, these three sample populations differed greatly in both size (63 in regressions 1-C and 2-C; 38 for 3-CBC and 4-CBC; 22 for 3-CTV and 4-CTV) and composition.

Returning once more to Tables IV-12 and IV-14, the following conclusions may be reached:

(1) A local CBC television station is able to retain its off-air audience relatively better than a CTV station when the number of off-air channels is few (compare rows (1), (2), (4)). This is the case in which neither the CBC nor the CTV station faces substantial duplication.

(2) When the number of channels available off-air is large, the CTV station is better able to retain its audience share. This is due in part ot the fact that the CBC channel now faces direct competition from other CBC channels,

whereas the CTV affiliate generally faces no such duplication. (See rows (5) and (6).

(3) An additional American off-air alternate will affect both types of Canadian stations about equally. (Compare the coefficient of -0.623 for CBC to -0.622 for CTV for the nlog X_3 terms in equations 3-CBC and (a) in footnote 53; and their respective coefficients of -0.138 and -0.127 in equations (a) of footnote 48 and 3-CTV.)

(4) Duplicate United States channels may prove to be relatively more harmful to CTV than CBC stations. The coefficient of the nlog X_4 term and X_4 term for CBC stations in equations 3-CBC and (a) in footnote 48 are respectively -0.132 and +0.006 whereas the corresponding coefficients in the CTV equations (a) in footnote 53 and 3-CTV are -0.209 and -0.012. None of these coefficients are significant at the 95% level, however.

(5) A CTV outlet appears to fare somewhat better on cable than a CBC outlet when facing only limited competition (rows (1), (2), (4)) due perhaps to the improvement in the former's signal.

(6) When the number of channels on cable is large, the CTV station will generally gain a larger audience share than the CBC station, this phenomenon being due in part to the duplication of CBC channels on cable while there is no duplication of CTV channels. In row (5), with one duplicate Canadian channel, the CBC station's share of audience is

25.1% compared to the CTV station's share of 20.5%, but in rows (6) and (7), as the number of duplicate channels rise to two and three respectively, the CBC station's share falls well below that of the CTV station's share.

(7) When a large number of channels may be received both off-air and on cable, the CBC affiliate appears to be less harmed by cable than the CTV station (row (6) and (7)). The former is able to retain quite well its off-air share of audience on the cable, while the latter shows a substantial decline in the CATV share of audience. By equalising the signal qualities through cable of United States and Canadian stations, CTV shows itself to be a good substitute for Unitdd States stations, while the CBC seems to be sufficiently differentiated to withstand this pressure.

(8) By comparing the coefficients of the X_5 term in equations 4-CBC and 4-CTV, which are respectively $\underset{(0.381)}{+0.0697}$ and $\underset{(-2.665)}{-1.715}$, the latter being significant at the 95% level of confidence, one may conclude that CTV stations have an insignificant effect on CBC stations on cable. Apparently the CTV audience does not come from the CBC but from what would otherwise have gone to the United States networks.

The coefficient -1.715 of X_5 in 4-CTV, however, is large and highly significant and shows the effect of alternate Canadian channels on the CTV on cable. This alternate service includes not only English CBC, which is carried on all CATV systems that carry CTV, but also the French CBC, an

independent French station CFTM, and the English independent CHCH.

(9) Duplicate Canadian channels hurt the cable viewing share of a CBC station, but are associated with increased cable audience for CTV stations (the coefficients of X_6 are -0.214 in equation 4-CBC and +0.421 in 4-CTV, both being significant). An explanation of this anomaly was given earlier.

(10) The coefficients of the X_7 term, and the nlog X_7 term, are much higher for CTV stations than CBC stations, indicating again the closer substitutability between CTV and United States stations than between CBC and United States stations. (The coefficients for the CBC are -0.076, -0.76, and -0.668 in equations 4-CBC, (a) and (b) in note 49, while for the CTV they are -0.317, -0.145, and -1.285 in equations 4-CTV, (a), and (b) of note 54.)

(11) Duplicate United States channels also hurt the CTV stations more than CBC stations on cable.

Next, regressions are displayed which show the audience-revenue relationship for Canadian television stations. Fifty-four privately owned television stations in Canada were put into the regression, and equation 12 shows the results based on data for 1970.

$$12.\quad R = -3082.1 + \underset{(9.939)}{38.763A} - \underset{(-6.525)}{0.0458A^2} + \underset{(3.043)}{21.532Q}$$

$$r^2 = .79$$

R = television station's total yearly advertising revenue in thousands of dollars.

A = average prime-time audience in thousands (7-11 p.m.)

Q = a market quality variable,[60] the mean value of which is 100.

The three coefficients are significant at the 95% level of confidence and have the expected signs.

Unfortunately, the high t-values and high r^2 of equation 12 are deceiving and it will be necessary to treat the hidden implications and underlying causes of equation 12 later in this chapter. For now, however, it is convenient to use

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[60]A market's quality index is described by its creators thusly:

> A market's percent of the national population can be taken to represent par. Divided into the Buying Power Index, it yields the Quality Index, which shows the extent to which the market's "quality" is above or below par (represented by 100). Since the quality index compares the per capita income and per capita sales to the corresponding figures for the U.S. a high index could reflect either high buying power or a high influx of shoppers....
>
> [The Buying Power Index is] a weighted index that converts three basic elements--population, Effective Buying Income and retail sales--into a measurement of a market's ability to buy, and expresses it as a percent of the U.S. potential. It is calculated by giving a weight of 5 to the market's percent of the U.S. Effective Buying Income, 3 to its percent of U.S. retail sales, and 2 to its percent of U.S. population. The total of these weighted percents is then divided by 10 to arrive at the BPT....
>
> [Effective Buying Income is] personal income-wages, salaries, interest, dividends, profits, and property income minus federal, state, and local taxes.... Effective Buying Income is generally equivalent to the Government's "disposeable personal income."

Sales Management Magazine, June 10, 1970.
For Canadian markets, of course, the bases used are Canadian rather than American.

equation 12 to complete the model of the financial impact of CATV on broadcasters.

By taking the partial derivative of equation 12 with respect to A, whereby $\frac{\partial R}{\partial A} = 38.753 - 0.0916A$, it becomes obvious that the impact of a change in audience size upon station revenues declines as the audience grows. For instance, if a station's average prime-time audience declines from 71,000 viewers to 70,000 there will be a resulting decline of $32,260 in total advertising revenues, while for a decline in viewers from 170,000 to 169,000, the decline in advertising revenues will only be $23,191 for the year.

By multiplying A, the average number of prime-time viewers, in thousands, in equation 12 by 19.5, the rough estimate used previously of the average number of prime-time viewing hours per viewer per week, equation 13 will express station revenues as a function of total prime-time viewing hours in thousands.

13. $R = -3082.1 + 755.879V - 17.415V^2 + 21.532Q$

where V = weekly prime-time viewing hours.

The change in revenues, due to a change in total weekly prime-time viewing hours, is:

14. $\triangle R = 755.879\triangle\hat{V} - 17.415V.\triangle\hat{V}$.

By combining equations 14 and 10, the estimated financial impact on a typical CBC privately-owned affiliate is finally derived:

15. $\Delta R = [755.879 - 17.415V] \cdot [(.084X_1^{-.56} X_2^{-.35} X_3^{-.62} X_4^{-.13}) - (.78 + .07X_5 - .21X_6 - .08X_7 + .03X_8 - .02X_5^2 + .03X_6^2) \cdot (19.5)(2.7) \cdot H_2)]$

where ΔR = change in revenues attributable to the presence of CATV

V = total prime-time viewing hours of station per week

X_i = various channel availabilities as defined previously

H_2 = number of CATV households within the station's grade-B contour.

19.5 and 2.7 represent respectively the average number of prime-time weekly viewing-hours (per viewer) and the average population over 14 years of age per household.

Equation 16 gives the estimated financial impact of CATV upon a CTV affiliate:

16. $\Delta R = [755.879 - 17.415V] \cdot [(.321 + .115X_1 + .061X_2 - .127X_3 - .012X_4) - (2.871 - 1.715X_5 + .421X_6 - .317X_7 - .153X_8 + .323X_5^2 - .070X_6^2 + .023X_7^2 + .029X_8^2) \cdot (19.5)(2.7) \cdot H_2]$

Equations 16 and 17 estimate the financial impact of an existing CATV system on the local broadcaster. They may also be used to predict the financial impact from any projected change. For instance, H_2 may be adjusted upward to reflect the projected ultimate number of cable subscribers. Similarly, any of the X_5 --- X_8 may be changed to reflect a desire by the cable operator to change his alignment of channels, and the differential effect of the change on the broadcaster may be estimated.

A short summary of the major findings in this section is next given.

(1) With regard to viewing time of the Canadian broadcasting system, it was found that successive additions of United States signals (both off-air and on cable) have a greater negative impact than the successive addition of Canadian channels, but there exists a significant declining marginal impact on viewing time for successive American channels. Whereas the positive marginal influence of additions of Canadian channel availabilities tends to be quite constant at 3 to 4%, the declining negative impact of United States channels is reflected by the predictions that the first United States channel will cause a decline of 20-25% in total Canadian television viewing time while the fourth United States channel will cause a decline of only 4-5%.

(2) With regard to viewing time of the Canadian broadcasting system, it was found that cable viewers tend to watch Canadian television only slightly less (3-6%) than off-air viewers when confronted with similar channel availabilities. There was no significant difference found in the effects of adding successive United States and Canadian channels upon viewing patterns of cable vs. off-air viewers. These similarities in viewing patterns between cable and off-air viewers are supported by CBC findings that cable and off-air viewers watch approximately the same amount of television per week.

(3) For any given line-up of channel availabilities, the expected viewing shares of the Canadian broadcasting system on cable and off-air are approximately the same, but the variations around the mean (predicted) shares are greater for the cable viewers than the off-air viewers, as reflected in the lower r^2's for the cable regressions. This finding may be interpreted as meaning that CATV subscribers show a greater discrimination in their viewing habits.

(4) With regard to the viewing time of a typical CBC affiliate it was found that cable will not significantly disturb the station's off-air viewing share if CATV does not import distant stations that would otherwise be unavailable. When CATV imports such stations, however, it can have a significant deliterious impact on the CBC affiliate's viewing share.

(5) Where the number of United States signals available off-air and on cable are few, CATV may help a CTV affiliate's audience by strengthening its signal. However, CTV suffers significantly with the importation via cable of otherwise unavailable American signals.

(6) CBC affiliates tend to be better able to maintain their audience shares in face of increased United States competition than do CTV affiliates, however CBC affiliates suffer due to duplication of CBC network programming on cable. The addition of a CTV network affiliate's signal to

a CBC affiliate's coverage area does not significantly disturb the latter's viewing share, indicating that the CTV station's audience comes in most part from that which would otherwise be captured by the United States stations. CTV and American stations appear to be relatively good substitutes and both appear to be relatively poor substitutes for CBC stations.

(7) While a strong statistical audience-revenue relationship exists, its actual significance is clouded due to factors not explicitly taken into account in the regression.

This completes the section on the econometric model of CATV's impact on broadcasters. Next, a discussion of the economics of broadcast advertising is presented, in which qualifications to equation 14 are given, including an analysis of that these qualifications do to the conclusions thus far presented. Then, the over-all financial picture of Canadian broadcasting is presented, and finally a summary and critique of CRTC cable policy is given.

IV. The Economics of Broadcast Advertising

"... as a general rule, the amount of public service broadcasting by a private station is inversely proportionate to its commercial success."[61] Taken literally, this quote from the Royal Commission Report would indicate that the

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[61]Royal Commission on Broadcasting. Report (Ottawa: Queen's Printer, 1957), p. 84.

expension of CATV in Canada, with its accompanying fragmentation of television audiences, will soon lead to an abundance of public service programming. One may be fully conversant, however, with the deliterious effects of mass advertising on television performance[62] and yet still be concerned over the plight of private broadcasters. Successive governmental studies have expressed the belief that Canada is a country that is held together in large measure by the broadcasting system. Yet broadcasting in a country of such large geographic expanse and sparse population is highly expensive, and one may reasonably feel that advertising revenues are a necessary evil in order to help finance a system too expensive for the public purse alone. However, CATV, as well as other factors, is presently threatening this source of private funds.

In 1969, the television broadcasting industry in Canada was financed by $271.4 million, of which only $129.0 million

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[62]See John McGowan. "Competition Regulation and Performance in Television Broadcasting," The Radio Spectrum, Its Uses and Regulation (Washington: Brookings), 1968; Peter Steiner, "Program Patterns and Preferences and the Workability of Competition in Radio Broadcasting," Quarterly Journal of Economics, 1952; P. Wiles, "Pilkington and the Theory of Value," Economic Journal, 1963; Leonard Chazen, "The Price of Free TV," The Atlantic Monthly, March, 1969; Harry Skornia, Television and Society (New York: McGraw Hill), 1965, esp. pp. 89-142; Peter Steiner, "Monopoly and Competition in Television: Some Public Policy Issues," The Manchester School of Economics and Political Science, 1961; Harry Boyle, Responsibility in Broadcasting (mimeo) a speech before the Meeting on Mass Media, Association of American Law Schools, San Francisco, Dec. 29, 1969; Canadian Dimension, "Brief to Mass Media," Canadian Dimension, Vol. 5, No. 8, 1970.

or 47.6% originated in parliamentary grants. In fact, advertising revenues accounted for 21.4% of the CBC's total revenues.[63] The importance of advertising to the present Canadian broadcasting structure can not be contested.

The time for broadcast advertising is characterised by an elastic demand and inelastic supply.[64] Supply is fixed due to several causes--technical reasons (scarcity of spectrum and the resulting interference problems), international treaty, government regulations (governing both the time devoted to advertisements and the number of stations) and policies of the broadcasters (especially the CBC).

Broadcasters are able in practice to affect the supply of commercial time to some extent, however. By making commercials more effective, they can increase the "productivity" of a given unit of time. This effect interacts with the tendency toward shorter commercials (30 second instead of 60 second) and both effects serve to increase the supply of time.

However, in the main, advertising revenue fluctuations will emanate from factors on the demand side. The advertisers' demand for Canadian television is a highly complex

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[63]Dominion Bureau of Statistics. Radio and Television Broadcasting 1969 (Ottawa: Queen's Printer), 1970, p. 10.

[64]O. J. Firestone. Broadcast Advertising in Canada. Past and Future Growth (Ottawa: University of Ottawa Press), 1966, p. 66.

area of study, and CATV is inseparable from it. In equation 12 of the previous section, a simple relationship between advertising revenues and audience size was posited. However, this simple relationship does not adequately treat CATV's full impact on broadcasters. This section will explore those factors which influence the demand for television advertising time and cable television's influence upon them. The factors to be explored are the advertisers' psychology, national income and corporate profits, the multinational corporation, United States television stations receivable in Canada, competing forms of advertising and advertising trends.

The economic theory of advertising is easily summarized. Advertising is treated as any other cost of production, except that it will change the slope and position of the demand curve. In the partial equilibrium situation, the marginal conditions hold and the optimal amount of advertising expenditure is determined.[65]

The demand for advertisements will depend at the very least upon the proportion of prospective customers reached by an advertisement, the length of time in which the message remains in the mind of a given proportion of these

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[65]See Harold Demsetz, "The Nature of Equilibrium in Monopolistic Competition," Journal of Political Economy, 1959; George Stigler, "The Economics of Information" in The Organization of Industry (Homewood: Irwin), 1968, Peter Doyle. "Economic Aspects of Advertising: A Survey," Economic Journal, Sept. 1968.

prospective customers,[66] the persuasive power of the advertisement, and on the advertising practices of competitors. In a world of certainty, an advertiser's marginal cost of reaching and convincing a customer will be the same from medium to medium and within each medium. For instance, if a full-page newspaper advertisement and a 60 second television commercial were equally effective in persuasive powers (x% of all readers and viewers purchased the product), the costs expensed for the advertisement in each medium would be equal on a cost per thousand people reached basis.[67] Similarly, the cost per thousand potential customers among newspapers and among television stations would be equal, and at the margin would equal the marginal revenue forthcoming from the additional advertising dollar spent less other costs of production.[68]

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[66]Stigler, op. cit., pp. 182-3.

[67]The costs expensed will not equal the revenues received by the medium, however, since the former include production costs. Since these are much higher for television, one would expect on this account that television revenues per 1000 viewers would be lower than for newspapers. See, however, footnote 68.

[68]However, as stated earlier, there are restrictions placed upon the amount of advertising time available on broadcast stations, while there is no such restriction on the space available in newspapers. This will raise the cost per thousand in television relative to that of newspapers.

The cost per thousand viewers for four categories of station size is given below in Table IV-16. The rate-per-thousand is defined as the rate-per-sixty-seconds of air time times 1000, divided by the circulation of the station. The circulation of a station is defined as the number of viewers who tuned in the station at some period between 6 p.m. and 1 p. m. during the sample week.

In practice, uncertainty and irrationality mean the above type of analysis has only limited value. Major television rating surveys are carried out only twice a year in Canada. This means that an advertiser, purchasing time well in advance of the audience surveys, is unable to predict with any accuracy the audience that will view a specific advertisement in a given time period on a station. Programmes on a station rise and fall quickly in popularity, and the programmes offered by competing stations will change. It is impossible for advertisers to accurately forecast the cost per 1000 viewers actually reached.

Rating surveys are carried out much more frequently in the United States, and advertisers are better able to assess

Table IV-16. Average Television Advertising Rates-per-Thousand by Station Size

Size of Station (no. viewers)	Average Station Size (no. viewers)	Rates per Thousand (¢)
Under 75,000	55,140	89.8
100 - 200,000	135,820	76.8
300 - 500,000	383,790	62.4
Over 500,000	1,017,000	43.7

Source: Mass Media, Vol. II, op. cit., pp. 282-3.

The declining rates per 1,000 show why the coefficient of the A^2 term in equation 12 was so significant. These phenomena reflect the fact that as an audience grows in size it becomes less and less homogeneous (in terms of geography, degree of urbanisation, average income, etc.) and hence television becomes less effective in pinpointing prospective customers.

the quality of their "buy." Since greater attention is paid to the ratings of individual programmes in the United States, and because the charges per unit of time vary accordingly, Park was able to obtain an r^2 of .93 when regressing station revenues against average prime-time audience (and the square of audience size) while equation 12 above yielded an r^2 of only .79.

Instead of audience size, then, advertisers in Canada are forced to search for a different (less desirable) measure upon which to base their demand for a station's time. The measure used in practice is reach, the number of homes tuning in the station sometime during the week (i.e., net weekly circulation).

When revenues were regressed against reach, a high r^2 of .93 was achieved. The full equation is given below.[69]

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[69]Revenues were regressed against other variables. The regression coefficient of these variables, i.e., b in an equation $y=a+bx$, are given in Table IV-17 along with the correlation coefficients and r^2's.

Table IV-17. Regression Coefficients, Correlation Coefficients and r^2's of Station Revenues Against Selected Variables

	b	r	r^2
Viewing hours	1.82	.86	.74
Average audience	.016	.87	.75
Average prime-time audience	.029	.89	.79
Rate card	.046	.95	.91
Cost per thousand	-0.0004	-.070	.005
Quality index, Q	.003	.39	.15
Reach	.245	.96	.93

Source: CRTC

17. $R = 20.358 + 0.245\ Re$ $\quad r^2 = .93$
$\quad\quad\quad

The reader should be cautioned before proceeding that for advertising policy there are as many special cases as there are advertisers. In this section, only broad generalisations are discussed, derived chiefly from interviews with broadcasters and people involved in selling time to advertisers.

Often a firm's advertising budget appears to be fixed to some percentage of retail sales or corporate profits. One thus finds the phenomenon whereby the advertising budget falls as sales fall and rises as sales rise whereas one would expect advertising expenditures to rise as sales drop in order to effect a recovery. It is impossible to generalise on the allocation of the advertising budget among different media that would be relevant to the analysis.[70]

A related factor mentioned in interviews was that television advertising confers status upon the firm and its management and this is apart from and in addition to advertising to increase sales. While it would be difficult to

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[70]Most of the explicable variation in the allocation of advertising budgets of firms among competing media is related to the location of the firm's sales and its type of product. What would concern an advertiser in selecting media is the proportion of the audience reached via a given medium that is composed of potential or possible customers. For instance, a small grocery store will not advertise on a large city television station since it must pay for reaching many people who are not potential customers, although a large supermarket chain may. Similarly, General Motors will not use television to advertise Cadillacs, although it may use a periodical of selected circulation to do this. However, the point made in the text remains--two firms producing highly similar products may decide on very different advertising mixes. This is simply an internal management decision and can not be analysed economically.

measure the relative importance of this status reason for advertising, it will to some degree mean that station revenues are even less responsive to changes in audience size. The "glamour" of television may compensate for sagging audiences.

A further departure from cost per thousand figures that influences advertising decisions is the fact that there are certain "must-buy" stations, those located generally in the provincial and federal capitals. Cost per thousand is not as important a factor for stations located in these centres as for stations in such municipalities as Dawson Creek, Rivière du Loup, Pembroke and Red Deer. In fact, it has been stated that many national advertisers are really quite indifferent as to whether their messages reach people in such small population centres, and stations located there survive only because the networks pressure these stations upon network advertisers, albeit by including them in the contract almost as a bonus for which the advertiser is charged a much lower rate.

CTV network stations are located only in "must-buy" centres (although plans are currently underway to extend the service to lesser-populated areas) and for this reason it may be expected that the rates charged for a time period by CTV stations will be less responsive to audience size than will be the rates charged by privately-owned CBC affiliates which are mainly located in these smaller communities.

Thus far, television stations have been able to defend themselves against shrinking audiences due to CATV where necessary. CHAN in Vancouver, for instance, has recently built a string of rebroadcasting stations in west-central British Columbia, thereby maintaining its audience by enlarging its coverage area in the face of cable competition.

Broadcasters have also been able to maintain revenues by offering advertisers "package deals," eg. selling one prime-time advertisement at the regular rate and throwing in a free non-prime-time spot, or in cases where the demand for prime-time is heavy, selling a prime-time spot only when a non-prime-time spot is also purchased. Thirty second commercials are relatively more expensive than sixty second commercials (two thirty-second commercials may sell for 150% of the price of a sixty second commercial) and the stations may push shorter commercials.

All of these factors listed above--the limited importance of audience size upon station revenues, and the importance of reach (population), the difficulty of assessing the effectiveness of advertising and the necessity of relying on rules of thumb to determine advertising budgets, the status given by television advertising, and the ability of stations to compensate for declining audiences--lead one to conclude that broadcasters have not been hurt yet by CATV. Table IV-18 compares the growth rates of CATV and television advertising for the past several years.

Table IV-18. Growth of CATV Subscribers and of Television Advertising Revenues

Year	Number CATV Subscribers in Canada	% Growth in CATV Subscribers	Total Television Advertising Revenue (Net)[b] (millions of $)	Growth in Television Advertising (%)
1960	na	na	50.0	
1961	na	na	54.1	8.2
1962	na	na	61.7	14.1
1963	na	na	70.2	13.8
1964	215,000	na	80.7	14.9
1965	273,000	27.0	91.6	13.5
1966	na	na	100.4	9.6
1967	517,000	44.6[a]	111.2	10.8
1968	710,000	37.2	114.9	3.3
1969	924,000	30.1	129.0	12.3
1970 E.			138.0	7.0

Source: Jones Heward and Co., Ltd., Advertising Media (Montreal), 1971, p. 4; Mass Media, Vol. II, op. cit., p. 404; Committee on Broadcasting, 1965 Report of the Committee on Broadcasting (Ottawa: Queen's Printer), 1965, p. 252.

[a] Growth rate averaged over two years.

[b] "net" = after agency and sales representatives commissions.

The evidence and discussion presented in this section up to this point indicates that if CATV has thus far had any effect on television revenues at all, it has been at the most, negligible. This is not to say that United States competition has not left its imprint on certain markets.

Table IV-18 shows a continuous rise in television broadcast advertising over the past decade in the face of a growing cable presence, the former averaging 10.8% per year. It is true that the yearly growth rate since 1968, which is about the time that the first concerns over CATV began to be expressed, has fallen to 7.5%; however, it may be unfair to blame CATV for the full amount of the decline.

One factor separate from CATV that has led to this decline is that television audience growth has reached the saturation point. The annual growth of t.v. households was 2.8% during 1966-69 compared with 4.6% during 1960-66.[71]

Secondly, the costs of advertising on television have been rising very rapidly, and may be causing television to become less competitive when compared with other media.[72] The annual rate of increase in the cost of television time since 1960 is 6.9% compared to an increase of 3.4% in radio's time. Calculations made from a table presented in the Davey

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[71]Jones Heward and Co., Ltd., op. cit., p. 8.

[72]The following table (footnote continued on the following page) shows station time charges per minute of prime-time since 1960.

Report indicate that the average annual rate of increase in newspaper (milline) rates from 1960-69 has been 2.8%.[73]

Table IV-20 shows a steady increase in the proportion of the total Canadian advertising expenditures going to television. Television advertising revenues as a proportion of GNP are also depicted.

It is apparent from Table IV-20 that advertising in Canada has been on the decline relative to GNP in recent years. Whereas in 1960, total advertising accounted for 1.46% of GNP, in 1969 it accounted for only 1.14%. The comparable figures in the United States for these two years are 2.36% and 2.10%.

Throughout this period, with the exception of two years (1966 and 1968), television has become relatively more important vis à vis other advertising media. However this gain in television's share of total advertising has been at a declining rate. The average increase in television's share in the first four years of the decade was 0.72% per annum,

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Table IV-19. Station Time Charges per Minute of Prime-Time

Year	Amount	Year	Amount	Year	Amount
1960	$84.90	1964	$113.57	1968	$145.02
1961	97.37	1965	119.06	1969	155.05
1962	103.57	1966	133.34		
1963	106.52	1967	138.09		
Average yearly growth: 6.9%					

Source: Pitfield, Mackay, Ross and Co. Ltd., op. cit., p. 35.

[73] Mass Media, Vol. II, op. cit., p. 85.

Table IV-20. Relative Proportion of Television Advertising to All Other Canadian Advertising Revenues and GNP ($ millions)

Year	Television Advertising Revenues (net)	Total Advertising Revenues-All Forms (net)	Television Revenues as % of Total Adv. Revenues	GNP	Total Advertising Revenues as % of GNP	Television Advertising Revenues as % of GNP
1960	50.0	549.9	9.1	37,775	1.46	0.132
1961	54.1	565.3	9.6	39,080	1.45	0.138
1962	61.7	597.3	10.3	42,353	1.41	0.146
1963	70.2	627.2	11.2	45,465	1.38	0.154
1964	80.7	674.5	12.0	49,783	1.35	0.166
1965	91.6	741.7	12.4	54,897	1.35	0.167
1966	100.4	812.6	12.4	61,421	1.32	0.163
1967	111.2	873.7	12.7	65,608	1.33	0.169
1968	114.9	910.8	12.6	71,454	1.27	0.161
1969	129.0[a]	982.9	13.1	77,385	1.14	0.167

Source: Pitfield, Mackay Ross and Co., Ltd., op. cit., pp. 16, 17, 19.

[a]Correction of error in Pitfield study--c.f. Jones Heward, op. cit., p. 4 and Nesbitt, Thompson and Company Ltd. The Broadcasting and Entertainment Industry, Review and Outlook, Section 8 (Toronto), 1970, p. iv.

while that for the last five years was 0.22%.

Since total advertising expenditures relative to GNP have been declining over time, and since television's share of total advertising has been increasing at a decreasing rate, one finds that television advertising in the first half of the decade was increasing relative to GNP and then became fairly constant in the second half.

The above analysis serves to show that CATV and other factors thus far mentioned have not yet had such a deliterious effect on television as an advertising vehicle that other advertising media are gaining at television's expense.

Advertising expenditures are closely related to GNP; however studies have shown that these expenditures are even more closely correlated with corporate profits lagged by one year.[74] This indicates that corporations may advertise only when they have idle money to spend.

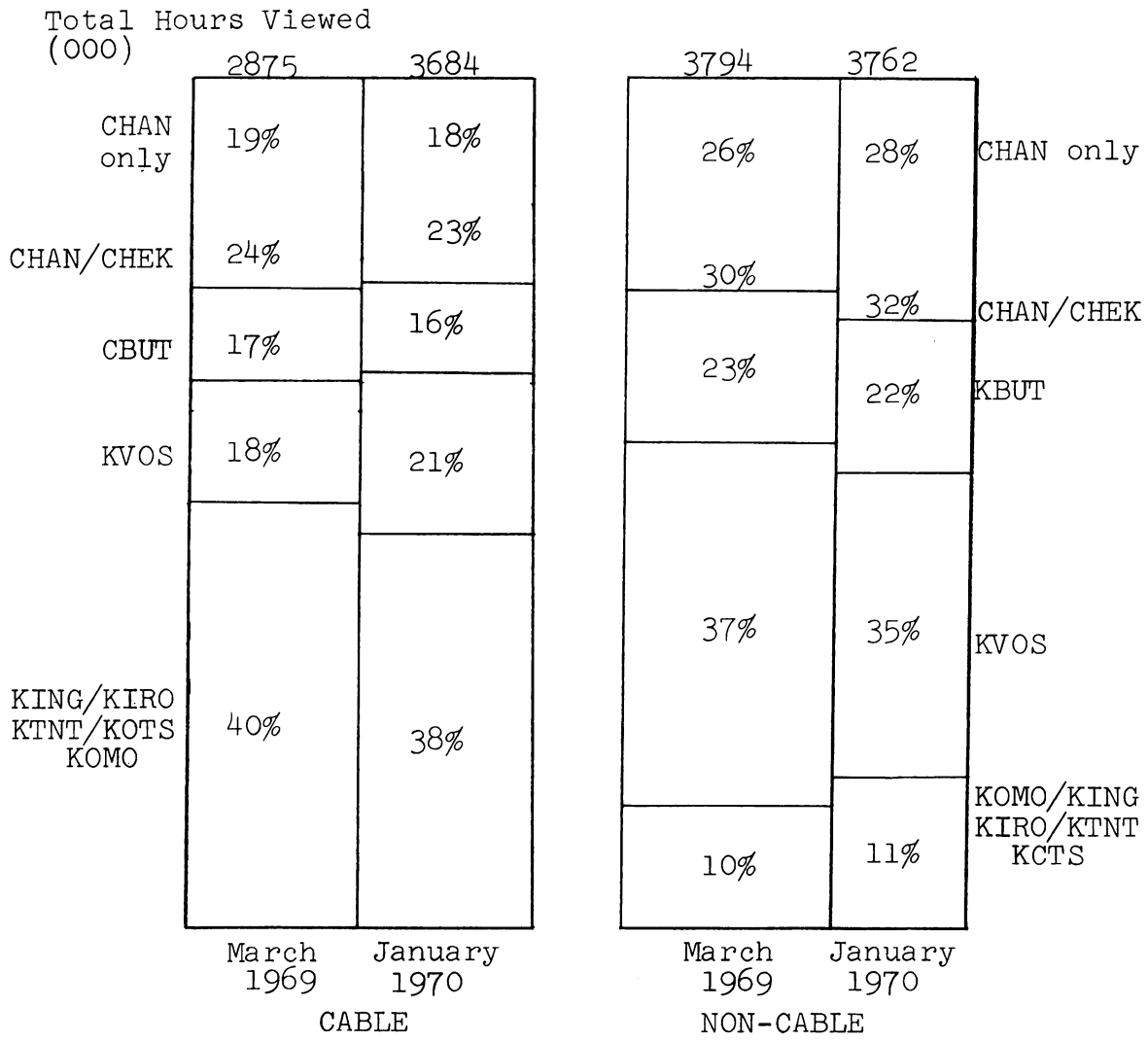
In Vancouver, three Canadian channels and one United States channel are available off-air (CBUT, CHAN, CHEK, KVOS), while cable subscribers are able to receive an additional 5 United States stations (KCTS, KING, KIRO, KOMO, KTNT). Figure IV-3 reproduces an A. C. Nielson chart showing the relative audience shares of the stations off-air and on CATV. Figure IV-3 should be studied in conjunction with Table IV-21.

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[74]Jones Heward and Co., op. cit., p. 8.

Figure IV - 3

Cable Vs Non-Cable Households
Canadian Vs. U.S. Station Penetration Into Vancouver Central Area.
(households - average week of three - January, 1970).



A. C. Nielson Co. of Canada Ltd., "Cable Study On Behalf of the Canada Association of Broadcasters", reprinted in Standing Committee on Broadcasting Films and Assistance to the Arts, Minutes of Proceedings and Evidence No. 30., June 11, 1970, (Ottawa: Queen's Printer) 1970 p. 30:94.

Table IV-21. Television Advertising per TV Home by Region, 1967

Area	Number of Television Homes ('000)	Total Privately Owned Television Broadcasting Revenue	Average Annual Privately Owned Television Broadcasting Revenue per TV Home
B. C.	538	$ 4,805,738	$ 8.93
Alta.	377	7,532,926	19.98
Man. Sask.	480	8,017,881	16.70
Ont.	1,917	36,532,112	19.06
Que.	1,408	22,120,812	15.71
Atlantic area	413	5,881,481	14.24
Total	5,135	84,890,950	16,53

Source: Mass Media, Vol. II, op. cit., p. 388.

Figure IV-3 shows that a single United States station, KVOS, obtains roughly 20% of the cable viewing hours in the Vancouver area, and 36% of the viewing hours of off-air viewers. Cable saturation in Vancouver is roughly 50% so that KVOS's total share of audience is 28%, and this share is larger than any other single station in the area. It has already been noted that Canadian television advertisers are most concerned with reach, and in nearly every market in Canada the home station has the greatest reach of all stations available. Such is not the case in Vancouver, and KVOS will

have at least a reach equal to that of the Canadian station with the highest reach.

Table IV-2I shows the results when a single United States station is able to capture the greatest audience share. As the Davey Commission Report states:

> The per household revenue of the private stations in British Columbia is only slightly more than half of the national average and much less than received in the other wealthy provinces of Ontario and Alberta.
>
> It is persuasively argued that this sharp differential is explained by the fact that the revenue drained off from the province by KVOS-TV is excluded from the D.B.S. figures.
> ... It has been suggested that, in fact, close to $6 million represents the actual amount of advertising revenue obtained by KVOS-TV in Bellingham.[75]

However, the Report then states:

> ... This assumption [regarding $6 million lost] is open to question. Given the fact that both the reach and the number of viewing hours of KVOS are only moderately higher than that of CHAN-TV (according to the B.B.M. survey for November, 1968) it seems to be a long leap to the conclusion that the advertising revenue of KVOS alone is equal to or greater than the revenue of all the private stations in the province combined.[76]

Unfortunately, the Mass Media Report missed the main point here. Advertisers are interested in reaching as many potential customers with their advertisements as is possible within their budget constraints. KOVS delivers more of this audience than any other single station. Advertising on Canadian channels is, then, to some extent, a wasteful

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[75] Mass Media, Vol. II, op. cit., p. 388.

[76] Loc. cit.

duplication. Many advertisers, in attempting to reach the Canadian market, will advertise exclusively on the United States channel. This is a world, it will be remembered, of the multinational corporation, a point to which we shall return directly.

The Davey Report does point out that "if the advertising revenue of private stations per household were calculated on the basis of ... the Alberta average, it would be nearly $6 million higher."[77] This adds further proof that the estimated $6 million loss to KVOS is fairly accurate.

It should be noted in passing that in Vancouver CATV may be expected to help Canadian broadcasting. By adding an additional 5 United States channels for Vancouver residents, CATV has caused KVOS's audience share to drop from a pre-cable share of 36% to a post-cable share of 20%, whereas CHAN experiences a decline from 27% to 18% and CBUT from 22% to 16%. KVOS' advantage over CHAN declines from 9% with off-air viewers to 2% with CATV viewers, and over CBUT from 13% for off-air viewers to 4% for CATV viewers. KVOS's advantage over its two Canadian rivals almost vanishes with CATV. While CATV does cause a substantial decline in the viewing shares of the Canadian stations, this lost viewing time is shared among 5 new United States stations, none of which will have the reach to make them a viable advertising vehicle to

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[77] Loc. cit.

reach the Canadian audience. This discussion is very important and will play a large part in the policy conclusions at the end of this chapter.

The Canadian economy has been described as being a part (a small part) of a new "neomercantilist system."[78] The phrase describes succinctly the role of the multinational (or, as its proponents seem to favour--the "international") corporation. The Watkins' Report makes the following observations:

> Foreign ownership and control of corporations located in Canada is concentrated in manufacturing, petroleum and natural gas, and mining and smelting. Foreign ownership of Canadian manufacturing industries has increased substantially from 38 percent in 1926 to 60 percent in 1963, and foreign control has increased even more, from 35 percent in 1926 to 60 percent in 1963.... Within the manufacturing sector, there are certain industries where foreign control is very high, and in all such cases ownership is predominantly by United States residents. In 1963, foreigners controlled 97 percent of the capital employed in the manufacture of automobiles and parts, 97 percent in rubber, 78 percent in chemicals and 77 percent in electrical apparatus. The corresponding figures for United States control were 97 percent, 90 percent, 54 percent and 66 percent.
>
> Not only is foreign equity capital concentrated in certain industries, but also it is concentrated in large corporations. In 1963, for 414 corporations with assets greater than $25 million, it is estimated that $19.9 billion or 53 percent of the total $37.9 billion of assets in these firms were in firms more than 50 percent owned by non-residents. On the other hand, for firms with assets of less than $25 million, $10.7 billion or

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[78]Dave Godfrey and Mel Watkins (eds.) Gordon to Watkins to You. A Documentary: The Battle for Control of Our Economy (Toronto: New Press), 1970, p. 223.

> only 32 percent of the total $34.0 billion of assets in these firms were in firms more than 50 percent owned by non-residents.[79]

It generally holds true, also, that industries which tend to use television for a large proportion of their advertising are by and large dominated by the multinational corporations. For instance, the automobile industry in 1969 spent $13,839,000 in gross national advertising and is 96% controlled in the United States.[80]

In fact, it has been estimated that 75% of national advertising on Canadian television is by multinational corporations that distribute the same product in the United States.[81] The CRTC hss estimated a loss of $24 to $30 million per year to the Canadian broadcasting system by the ability of the United States multinational corporations to reach the Canadian market through United States television.[82] The CRTC further estimates that some $12 to $15--million a year of Canadian money is spent to buy commercial time on United States television stations,[83] thereby giving a total loss to the

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[79]Task Force on the Structure of Canadian Industry. Report. Foreign Ownership and the Structure of Canadian Industry (Ottawa: Queen's Printer), 1968, pp. 9-12.

[80]Pitfield, Mackay Ross and Co., Ltd., op. cit., p. 71, and A. E. Safarian, Foreign Ownership of Canadian Industry (Toronto: McGraw-Hill), 1966, p. 16.

[81]Woods, Gordon Co., Ltd., op. cit., p. 47.

[82]Canadian Radio-Television Commission, "The Integration of Cable Television in the Canadian Broadcasting System," Public Announcement, Feb. 26, 1971, p. 5.

[83]Loc. cit.

Canadian broadcasters of $36 million to $45--million a year due to this border spill-over effect.

Woods-Gordon, in their study, reached comparable figures, and it is worthwhile quoting directly from their study:

> ... because many Canadian markets receive signals from U.S. television stations, national advertisers (most of which are international companies) need to spend relatively less on Canadian television in order to achieve their reach and frequency requirements. The effect of this "spill-over advertising has been to restrict the growth of national advertising in Canada....
>
> We estimate that currently upwards of $40 million in national advertising revenues are lost each year to the Canadian television industry because of the influence of the U.S. border stations. We base this estimate on a comparison of the trends in the relationships of media advertising revenues to Gross National Product in both Canada and the United States....
>
> This estimate is consistent with the one published recently by the CRTC in its February statement on cable television, although the Commission's estimate was arrived at using an entirely different method.[84]

Table IV-22 shows the relative importance of national advertising in Canada through the years, while Table IV-23 documents its declining rate of growth.

It will be noted in studying Tables IV-22 and IV-23 that the growth in national advertising has been declining steadily through the decade, but that local advertising has been unable to gain a greater relative share of total advertising. Woods-Gordon attributes the existence of United States signals and the multinational corporation as the major underlying causes of the decline in growth of national advertising,[85]

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[84]Woods, Gordon, op. cit., pp. 25-8.

[85]Ibid., p. 25.

Table IV-22. Break-down of Net National and Local TV Advertising (1962-70) ($ millions)

Year	National	Local	Total	National as % of Total
1962	$ 49.4	$12.4	$ 61.8	80%
1963	55.1	15.1	70.2	79
1964	64.6	16.1	80.7	80
1965	72.8	18.8	91.6	80
1966	81.6	18.8	100.4	81
1967	90.1	21.1	111.2	82
1968	92.6	22.3	114.9	81
1969	102.9	26.2	129.1	80
1970 est.	110.0	28.0	138.0	80

Source: Jones Heward and Co., Ltd., op. cit., p. 6.

Table IV-23. Average Annual Growth in National Advertising Revenues, Three Year Moving Average (1961-70)

Period	Growth
1961-64	16.2%
1962-65	14.8
1963-66	13.2
1964-67	12.0
1965-68	9.1
1966-69	6.8
1967-70	5.9 est.

Source: Woods, Gordon, op. cit., p. 35.

and they feel that the failure of local advertising to take up the slack is due to the fact that local advertising is often inappropriate for television due to high production costs and the large size of audience.[86] They conclude that it is unlikely that stations will be able to compensate for the decline in national advertising by increasing local advertising.

Advertising by television has certain inherent advantages over other media. It is the only medium to make use of three dimensions--sight, sound and motion, and therefore has a greater impact upon social behaviour.[87] Television has access to captive audiences who must accept the commercials in order to receive the programmes.[88]

However, television has certain disadvantages when compared to other media. Of concern to us at this time are the expensiveness of television advertising on a cost per thousand basis, with rates rising steadily, and the fact that television is a mass medium, rather than a "class" medium. In recent years, radio stations and periodicals have been able to segment the total population into interest groups by differentiating their products. In so doing, advertisers have been better able to reach their target audiences from the population at large.

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[86] Ibid., p. 33.

[87] Firestone, op. cit., p. 65, and Pitfield, op. cit., p. 24.

[88] Ibid., p. 65, and ibid, p. 24.

Since such more specialised media have a more homogeneous audience and readership than television stations, advertisers are willing to pay a higher rate per thousand than would be the case if these media were less specialised. This is due to the fact that these advertisers are no longer required to pay for a large proportion of the audience reached which has no interest in purchasing the product advertised.

With Table IV-24, one may compare the relative success of the major advertising vehicles in Canada for the past several years.

During the decade, television's share has increased from 9.1% to over 13%, and average annual growth in revenues has been 10.9%. However, due to the fragmentation effect of CATV, rising production costs in making commercials, and increases in rates charged, most financial analysts feel that television's period of relative growth is probably over.[89] Since 1965, in fact, radio has shown a higher growth rate than television.

It is now necessary to piece together CATV's role in the various facets of the problem and attempt to integrate what has been admittedly a rather rambling discussion to this point.

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[89]See Nesbitt, Thompson and Co., Ltd., op. cit., p. v; Jones Heward and Co., Ltd., op. cit., p. 8; Pitfield, Mackay, Ross and Co., Ltd., op. cit., p. 42.

Table IV-24. Percentage Distribution of Net Advertising Revenues by Media

Year	Radio	TV	Newspapers	Periodicals	Other Printed Media	Outdoor Advertising	Total Net Advertising Revenues
1960	9.2%	9.1%	38.3%	15.3%	21.4%	6.7%	100.0%
1961	8.8	9.6	38.1	14.7	21.9	6.9	100.0
1962	9.0	10.3	38.0	13.8	21.7	7.2	100.0
1963	9.4	11.2	36.7	13.3	22.7	6.7	100.0
1964	9.7	12.0	35.7	12.8	22.1	7.7	100.0
1965	9.5	12.4	36.3	12.3	21.3	8.2	100.0
1966	9.8	12.4	35.3	12.1	21.3	9.1	100.0
1967	10.1	12.7	34.4	12.1	21.0	9.7	100.0
1968	10.4	12.6	34.0	11.6	21.0	10.3	100.0
1969	10.8	13.3	33.5	11.5	20.1	10.5	100.0

Source: Pitfield, Mackay Ross Co., Ltd., op. cit., p. 17.

Were a cable television consultant attempting to show that CATV has had little or no deleterious impact on broadcasters, he could cite the evidence presented in this section and his case would be fairly strong. In short summary, the following points are most important:

(i) Advertisers do not pay close attention to ratings and are more concerned with reach. CATV may cause the reach of a local station to decline, but has not yet caused the local station to lose its position as the station with the greatest reach. Therefore, the local station remains the best buy for advertisers attempting to reach the population in the area.

(ii) Television has continually grown in relative importance vis à vis other media, offering proof that CATV has not adversely affected television's viability as an advertising medium. While television's growth has declined in recent years, this may be attributable to exogenous factors, such as the decline in the growth of new television households.

(iii) Broadcasters have been able to compensate for whatever effects their fragmented audiences may have had on revenues by offering package deals, producing more productive commercials extending their coverage area through translators, etc.

May we then be satisfied that broadcasting and CATV are quite compatible and that the concern expressed over CATV for the past several years is misplaced and exaggerated?

Not really. The concern is well placed. Each of the three points above will now be tackled.

(i) While advertisers have thus far been content to rely upon reach, they are becoming more and more aware of its inadequacies. If rating surveys come to be undertaken as often as in the United States, average audience size would then become the most important measure determining advertising revenues and station revenues would deteriorate accordingly.

The effects of continuing cable growth may be just as harmful without more frequent audience surveys. In 1969, only 17% of television households were cable subscribers. However cable television has been experiencing a growth rate of over 30% per year. The CRTC has recently announced that CATV systems too far from the border to be able to bring in United States signals through conventional means may now do so with microwave. This all points to a very high over-all cable penetration within a few years. It would clearly be naïve to believe that advertisers will not become increasingly concerned as audiences become more and more fragmented. In such an event, advertising expenditures on Canadian television could not help but decline.

(ii) While it is true that television has continued to capture a large share of the advertising pie in the face of mounting competition from stations imported by CATV, its rate of advance has been declining and most observers feel that

television's share has probably stabilised at about 13% of total advertising expenditures. This indicates that factors which led to television's rapid growth have also stabilised (increased effectiveness of commercials, increasing saturation of homes by television, the novelty of t.v.).

In fact, it may be persuasively argued that television will become a less effective advertising medium in the years ahead. So long as television depends upon mass advertising, it must deliver a mass audience. The prospects of television changing into a specialised medium financed by specialised advertising seem unlikely in view of Canada's small population, the scarcity of television channels, and the lower level of advertising relative to GNP in Canada when compared to the United States. As the audience size and reach of local stations continue to decline because of CATV, mass advertisers will find it necessary to advertise more often and on more stations in order to have the same impact on each given market. This is the same as saying that each advertising dollar spent will become less and less effective in inducing sales. This will probably cause a substantial shift away from television and into other media or simply less advertising altogether.

It will be recalled that 75% of national advertising in Canada is undertaken by multinational corporations. National advertising accounts for 80% of all television advertising. Therefore, multinational advertisers account for 60% of

Canadian television advertising. Total viewership of United States television in Canada accounts for only 18% of all viewing time. Evidence shows that when United States channels obtain a substantial portion of the audience in border cities (for example Vancouver and Windsor) many multinational corporations decrease their advertising expenditures on the local stations. It seems quite likely if and when United States television succeeds in obtaining a more substantial share of Canadian viewing time (perhaps 30-40%) there will be a substantial, permanent decline in television advertising in Canada. United States television will undoubtedly gain at least this percentage total viewing time when CATV has become established in most of the cities and towns of Canada and when cable has obtained a saturation of over 50%. It is also suspected that this decline in revenues may be quite sudden.[90]

As stated before, local advertising will not take up the slack. Fragmentation of audiences makes local advertising much less effective on television than does it make

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[90]Stations that now compete against a strong United States television presence have not yet felt the full effects of such competition since such stations are often "tied-in" to network sales. Network sales have not yet suffered to a great extent since only 18% of Canadian viewing time is spent watching United States stations. However, any decline in network advertising caused by an increased viewing share obtained by American channels because of CATV growth will remove this protection that such stations currently enjoy. Given the rule-of-thumb policies of advertisers, and the tendency of competitors to follow each other in advertising expenditures, it is possible that a few initial decisions to the effect that network advertising is no longer worthwhile may start a chain reaction.

national advertising ineffective.

(iii) Broadcasters are currently running out of "tricks". Only so many rebroadcasting stations can be built without fragmenting audiences as seriously as does CATV. The time constraints of the broadcast day means that only so many package deals can be offered. Broadcasters have told me that in the past Canadian broadcasting had been inefficiently managed, but the arrival of CATV had caused broadcasters to tighten their belts and become much more efficient. Unfortunately, the belt-tightening has also reached a point at which further cut-backs will cause an audience decline through poorer performance.

V. Broadcasting Costs and Profitability

One cannot analyse CATV's impact on broadcasters in a vacuum. While CATV may have had or will have a substantial effect upon broadcast revenues one should investigate whether this reduction results in simply lower monopoly profits with little effect on performance (or even improved performance through competition), or if it will make television broadcasting in Canada completely unprofitable.

Table IV-25 shows the over-all profitability of the Canadian television industry in 1969, and Table IV-26 shows the profitability for stations by revenue group as found in the DBS statistics.

The eleven largest private t.v. stations account for over 58% of the total operating revenues and over 56% of the

Table IV-25. Operating Revenue and Expenses of the Television Broadcasting Industry, 1969

	Private Stations	CBC, Radio-Canada
Operating revenue:		
Revenue (net) from sales of air time		
Local time sales	$24,175,110	$ 2,001,000
National time sales	58,562,367	11,236,000
Network time sales	11,194,471	21,893,000
Total Revenue from sale of air time	93,931,948	35,130,000
Incidental operating revenue	12,642,508	736,000
Total Operating revenue	106,574,456	35,866,000
Parliamentary grants	--	129,002,000
Total Operating Revenues and Parliamentary grants	106,574,456	164,868,000
Operating Expenses:		
Total Operating Expenses	84,646,388	164,868,000
Net operating profit including Parliamentary grant	21,928,068	--

Source: Dominion Bureau of Statistics, Radio and Television Broadcasting 1969, op. cit., p. 10.

total operating expenses of the privately-owned sector of Canadian television; the top 17 stations account for almost 74% of the revenues and over 71% of total expenses; the top 26 stations for almost 83% of the revenues and almost 82% of the total expenses. The remaining 41 stations account for only 17% of the revenues and 18% of the expenses.

Similarly, the 11 largest, private t.v. stations account for 62% of the net operating profits, the largest 17 for 81% of the profits; the top 26 stations for over 86% of the profits. The remaining 41 stations share 14% of the industry net operating profits. The smallest 11 stations had an average net operating profit of $4,718 in 1969 (see Table IV-26).

In spite of the strikingly close relationship between revenues and expenses, the economies of scale in television are large. This is due to the high fixed costs involved in television broadcasting and an insignificant marginal cost of reaching an additional viewer within the coverage area. However, large stations either out of their own volition or by the pressures of competition from United States and other Canadian stations, follow policies that yield a constant cost-revenue relationship.

The Mass Media Report has shown that the fixed cost inputs fall in importance as circulation (revenues) grow.[90] In contrast, "quality" cost variables (expenditures on films,

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[90] Mass Media, Vol. II, op. cit., p. 299.

Table IV-26. Operating Revenue and Expenses of the Privately-Owned Television Industry by Revenue Group, 1969

Revenue Group	Local Time Sales	Network Time Sales	National Time Sales	Other Revenue	Total Operating Revenue	Total Operating Expenses	Net Operating Profit
Under $250,000 (11 stations)	$745,362	$288,454	$588,521	$66,850	$1,689,187	$1,637,286	$51,901
$250,000-499,999 (15 stations)	2,275,263	1,220,784	2,034,231	135,854	5,666,132	5,290,866	375,266
$500,000-999,999 (15 stations)	4,165,056	1,935,671	4,935,484	233,784	11,269,995	8,701,285	2,568,710
$1,000,000-1,499,999 (9 stations)	3,648,516	1,732,310	4,168,787	293,771	9,843,384	8,672,464	1,170,920
$1,500,000-2,999,999 (6 stations)	3,370,546	2,150,205	9,665,795	695,077	15,881,623	11,751,636	4,129,987
$3,000,000 and over (11 stations)	9,970,367	3,867,047	37,169,549	11,217,172	62,224,135	48,592,851	13,631,284
Total (67 stations)	24,175,110	11,194,471	58,562,367	12,642,508	106,574,456	84,646,388	21,928,068

Source: DBS. Radio and Television Broadcasting 1969, op. cit., pp. 18-19.

tapes and artists' fees) rise. It was found that such "quality" expenditures rise significantly for television stations above $1,000,000 in annual revenues.[91] It is these "quality" expenditures that cause total expendisutes to rise at the same rate as revenues. It will be remembered that the largest 26 private stations in Canada obtain revenues in excess of $1,000,000 per year, and the remaining 41 of the DBS classification of stations seem to be unable to make significant amounts of such quality expenditures. It seems there may be at least 26 stations in Canada that are marginal operations.

Programming costs account for over 60% of the CBC's gross expenditures[92] and 75% of the CTV annual budget.[93] The crisis in Canadian broadcasting is due to the inability of the television industry to amoritize these programme costs over a large number of viewers. In fact, as will be apparent momentarily, this causes a double squeeze on profits.

Table IV-27 shows a break-down of programming costs for the CBC while Table IV-28 gives programme costs of the CTV network.

The prime-time entertainment programmes of Table IV-28 and "Untamed World" are co-produced in the United States or

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[91] Ibid., p. 302.

[92] Canadian Broadcasting Corporation, Annual Report 1969-70 (Ottawa), 1971, p. 69.

[93] Woods Gordon, op. cit., p. 3.

Table IV-27. CBC Programme Costs, 1970

	English Language			French Language		
	Total Cost	Hours	Aver. cost/hr	Total Cost	Hours	Aver. cost/hr
Local live	$21,152,000	6,936	$3,049	$3,234,000	573	$5,644
Local film	2,292,000	11,121	206	116,000	673	172
Network live	32,849,000	2,735	12,011	30,480,000	2,927	10,413
Network film	5,089,000	1,102	4,618	5,478,000	2,737	2,001

Source: CBC Annual Report, op. cit., p. 71.

Table IV-28. Costs of All CTV Canadian Programmes (1970-71)

Programme and Type	Annual Cost (Per Weekly Hour of Programming)
Prime-time entertainment	
Nashville North	$775,000
Barbra McNair	716,000
Pig and Whistle	626,000
Prime-time information	
Here Come The 70's	1,071,000
W 5	856,000
Untamed World	468,000
Sports Beat '70	520,000
Weekend Aftertoons	
University Challenge	364,000
Come Together	322,000
Question Period	177,000

Source: Woods Gordon, op. cit., p. 68.

syndicated in the United States. On average, such shows cost CTV $700,000 a year.[94] In contrast, completely American programmes cost CTV around $235,000 a year for 52 hours of programming or well under 35% the cost of a "quality" Canadian production. Were the above prime-time entertainment programmes produced solely in Canada without syndication, they would cost CTV about $1,000,000 per year meaning that United States shows cost CTV roughly 25% of the cost of producing quality

[94]Fifty-two hours, composed of generally 25 different episodes with 1 rerun each and allowing for pre-emptions.

Canadian shows.[95] It should be noted in passing that the United States networks spend well over $200,000 an hour for a series of prime-time programmes.

The average costs of Canadian programmes have been increasing at a rate of 10-20% per annum. And, as CRTC Canadian content regulations become fully operative, the costs of such programmes may rise even faster.[96]

A CRTC staff economist has estimated for me that a show in Canada could be produced at about one-half the cost of the same show in the United States due to lower labour costs (generally $100,000 per hour vs. $200,000/hr in the United States). Additionally, the Canadian scale of production can be cut without any real effect on the programme quality to around $60,000/hr (for example using a Volkswagen instead of three Corvettes). He further estimated that at least $30,000 per hour is necessary to obtain near average ratings, but to be profitable, an expenditure of $50-$75,000 per hour is necessary, and these are the typical total production costs of co-productions and Canadian programmes syndicated in the United States. Of this $50-$75,000, the Canadian networks will typically contribute $10,000 (per hour).

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[95]Woods Gordon, op. cit., pp. 69, 70.

[96]Ibid., p. 73. A content analysis of Canadian television as to country of origin, type of programmes, and viewer-shares thereof is given in W. Brian Stewart, "The Canadian Social System and the Canadian Broadcasting Audience," in Benjamin D. Singer (ed.) Communications in Canadian Society (Copp Clark), 1972.

Currently, CTV charges roughly $28,000 per hour for advertisements on Canadian shows, assuming 10 one-minute spot announcements per hour with no discounts and not taking into account advertising commissions or allowing for unsold time. Of this $28,000, $20,000 is typically the realised net income. For United States shows, CTV charges $35,000 per hour under the same assumptions, and will in fact realise perhaps $26,000 in net income.

CTV can afford to spend, as pointed out earlier, 70-75% of their revenues on programming, or a maximum of $14,000 per hour (70% of $20,000).

A CTV programme cost forecast for 1970-71, a year in which Canadian content has risen somewhat, is shown in Table IV-29.

It has been shown, then, that Canadian production of the United States type glossy, light entertainment shows is impossible without foreign sales. When such productions are undertaken with the purpose of foreign sales, Canadians can compete, but one may wish to question the use of the exercise. Why should Canadian broadcasters concentrate on making imitations of the Beverly Hillbillies and Carol Burnett when they can have the real thing at such a low price? Such programmes do nothing to "safeguard, enrich and strengthen the cultural, political, social and economic fabric of Canada,"[97] but rather divert scarce creative talent from other endeavours.

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[97] Broadcasting Act, 1968.

Table IV-29. CTV Network 1970-71 Programme Cost Forecast[a]

	Total Hours	Hours in Prime-Time	Total Cost	Cost per Hour
Network Sales Time[b]				
Canadian, regular	518.5	209	$4,166,140	$8,035
Canadian, specials	64.25	32.5	761,500	11,852
Canadian, national news	109.5	109.5	1,087,500	9,932
Non-Canadian, regular	603	417	2,321,050	3,849
Non-Canadian, special	39	35.5	76,000	1,949
	1,334.25	803.5	$8,412,190	$6,305
Station Sales Time[c]				
Canadian, regular	462.5	26	1,233,720	2,668
Canadian, specials	19	7.5	69,500	3,658
Non-Canadian, regular	418	287.5	1,685,220	4,032
Non-Canadian, special	5	5	5,000	1,000
	904.5	326	$2,993,440	$3,309

Source: confidential

[a]Excluding distribution costs of $1,176,000 in network time and $837,200 in station time.

[b]Excluding CFL football and NHL hockey.

[c]Excluding feature films, shelf, strip and co-op.

There are then, three basic alternatives for Canadian broadcasting:

(i) to become simply relayers of American pop television, in which case audiences and revenues would undoubtedly be the largest and costs the lowest.

(ii) compete on the same plane with the Americans by manufacturing light entertainment shows at high cost for the international market. In such a case, audiences and revenues would be somewhat lower than in case (i), and costs somewhat higher and there would be little meaningful difference in the results on the television screen.

(iii) face the fact that the Canadian audience is only 10% as great as the United States audience and therefore production costs can not be as great as in the United States, but try to programme for a distinctly Canadian audience, and win or lose by the success the Canadian producers have in differentiating their products in this way.

There is little doubt in which way the economics of broadcasting and the profit motive would push broadcasters were they free from regulation to decide which course to take.

As stated, the economics of programming works in a second way also. United States programmes on Canadian t.v. tend to attract the higher audiences. A BBM survey for Nov. 2 to 15, 1970 showed that only three of the top ten shows on the CBC (Adventures in Rainbow Country, Hockey, and Wayne

and Shuster) were Canadian, while the CTV had but two Canadian shows in its top 10.[98]

Such differences in audiences are reflected in the rates that can be charged for Canadian and United States shows. In Table IV-30 are shown the average advertising revenues, direct costs, and profit margins for an average hour of programming from the United States, Great Britain and Canada for such programmes shown on the CTV network.

Substantial portions of the earnings on the Canadian shows in Table IV-30 are said to be the result of force-packaging with the United States shows carried on CTV. As it is, even with rate discounts of 20-28% from the rates charged for United States programmes and force-packaging, the advertiser is forced to pay a higher rate per 1000 for the Canadian shows. See Table IV-31.

The three United States shows of Table IV-31 were the lowest rated of CTV's United States shows.

So there is a vicious circle operative in the private sector of Canadian broadcasting:

- Canadian programmes reach a smaller audience than United States programmes, and so must be less costly.
- Lower cost Canadian productions cannot compete for audiences with high cost, slick United States programmes.

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[98]Toronto Telegram, Dec. 14, 1970, p. 44.

Table IV-30. Cost, Revenue and Margin for Each Hour of Programming on CTV by Country of Origin, 1971

Country of Origin	Average Revenue	Average Direct Cost	Average Margin
United States	$22,000	$ 5,400	$16,600
United Kingdom	16,900	5,400	11,500
Canada	16,800	14,500	2,300

Source: Woods, Gordon, op. cit., pp. 14, 15, 81, 82, 83.

Table IV-31. Selected CTV Network Prime-Time Programmes. Relationship Between Revenues and Audience Levels

Programme	Homes Viewing (Nov. 1970) ('000)	1970-71 Revenues Booked to Jan 31, 1971 ($ 000)	Av. Annual Revenues Per Home Delivered
United States			
Glen Campbell	730	873	$1.20
Andy Williams	689	897	1.30
Matt Lincoln	618	667	1.08
Canadian			
Untamed World	552	444	1.61
Barbra McNair	565	847	1.68
Nashville North	488	440	1.80

Source: Woods, Gordon, op. cit., p. 44.

- Stations receive less advertising revenues for Canadian shows than their United States shows.
- the CRTC is raising the Canadian content quotas for television, and so the cost-revenue differential between United States and Canadian shows may become more pronounced.
- if networks attempt to cut back on expenses in producing Canadian programmes, audience will decline and so will revenues.
- if stations attempt to raise the quality of Canadian programmes in order to raise revenues for these shows, costs will get even more out of line from prices charged by the Americans.

And into this conundrum enters CATV. No data is available at this time as to whether CATV, by bringing in otherwise unobtainable United States stations, has its largest impact on the Canadian or on American shows carried by the Canadian networks. What CATV will do, however, is to lessen the profit margins of all private television, and this may be expected to cause a decline in the expenditures toward Canadian programmes and the vicious circle starts over again.

It will be remembered that the smallest 41 television stations in Canada (i.e., 61% of all private t.v. stations), account for only 14% of the industries' profit, averaging profits of $73,000/yr. The smallest 11 stations average $4,700 per year in profits. The largest stations, however, tend to be highly profitable, as Table IV-32 demonstrates.

Table IV-32. Before Tax Return on Assets--Private Canadian Television (1965-68).

Revenue Category	1964	1965	1966	1967	1968
Less than $250,000	-5.9	-8.4	-0.6	+6.5	-1.6
$250,000 to 499,999	4.6	11.2	5.6	4.8	6.5
$500,000 to 999,999	25.3	10.0	2.0	13.2	18.3
$1,000,000 to 1,499,999	16.7	39.9	5.7	30.7	21.4
$1,500,000 and over	22.6	31.2	26.0	21.1	31.9
All stations	18.5	25.5	19.4	19.6	27.9

Source: Mass Media, Vol. II, op. cit., p. 344.

Stations with revenues under $500,000 a year are clearly marginal, and represent 25 of the privately owned stations in Canada. Such stations are located by and large in areas well removed from the United States border. Since the CRTC has finally given authorisation for CATV systems to import United States signals via microwave, it is to be expected that in the near future many of these stations will face intensive competition from the United States stations. While it is highly unlikely the government or the CBC would allow the abandonment of television service to such areas, CATV could necessitate the CBC's taking over the operations of these marginal stations. In such a case, revenues would be diverted from programming on the CBC.

Stations with revenues over $1,500,000 a year (17 stations) are highly profitable and are also assured of obtaining

a higher than normal profit rate through time. The middle group ($500,000 to 1,500,000) show widely fluctuating profit rates and although these profits are very high on occasion, such instability may cause these stations to be very conservative in their programming expenditures.

It will also be recalled that stations with revenues over $1,000,000 a year showed the highest relative expenditures on "quality" inputs. If CATV causes a reduction in the revenues of the most profitable stations, it will be the expenditures on the "quality" inputs that shall be reduced first. This is not mere speculation. This conclusion is derived both from the past behaviour of the lower-revenue stations and from the fact that expenditures on such quality inputs are the truly variable or discretionary costs in television broadcasting.

One may lament that the large revenue earners are not contributing an adequate amount of revenue to the broadcasting system, as witnessed by the extraordinary profits. Such a criticism really challenges however, the whole concept of private enterprise in broadcasting. While this concept may well be challenged, this is not the place for such a condemnation. Suffice it to say that with a shrinkage of revenues, performance will probably fall too.

There is one further cause for alarm stemming from increased competition from United States stations. Harvey Levin states that competition in mass media (in Levin's case,

competition among different media) may at some point become so severe as to make it impossible for the weaker groups to resist organised special interest groups and may force these media owners to reduce the standards of taste and culture. He states that financially weak enterprises are quite susceptible.[99] In a similar vein another observer has spoken of a "cultural Gresham's Law" whereby the social products with the least social value receive the widest circulation."[100] It has been shown above how economic pressure causes a cutback in broadcasters' pursuit of quality.

In addition, the economic theory of broadcasting has well established that increased competition in private broadcasting will under normal circumstances (i.e., limited channels) not promote diversity in programming, but rather induce duplication.[101]

These factors should be kept in mind when reviewing the cable policy of the Canadian Radio-Television Commission.

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[99]Harvey Levin. Broadcast Regulation and Joint Ownership of Media (New York: New York University Press), 1960, p. 103.

[100]Herbert I. Schiller. Mass Communications and American Empire (New York: Kelly), 1970, p. 109.

[101]See works cited in footnote 62.

VI. An Appraisal of CRTC Cable Policy

The 1968 Broadcasting Act created the Canadian Radio-Television Commission, which was declared to be "a single independent public authority" charged with "the regulation and supervision of the Canadian broadcasting system[102] . . . with a view to implementing the broadcasting policy enunciated in section 2 of [the] Act."[103]

Section 2 of the Act lists the broad objectives of broadcasting in Canada, the most important of which follow.

> Section 2(b). The Canadian broadcasting system should be effectively owned and controlled by Canadians so as to safeguard, enrich and strengthen the cultural, political, social and economic fabric of Canada.
>
> Section 2(d). . . . the programming provided by each broadcaster should be of high standard, using predominately Canadian creative and other resources.
>
> Section (f). There should be provided, through a corporation established by Parliament for the purpose, a national broadcasting service that is predominately Canadian in content and character.
>
> Section (g). The national broadcasting service should (iv) contribute to the development of national unity and provide for a continuing expression of Canadian identity.

Under the Act, the Commission has the power to issue and revoke broadcast licences and to make regulations

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[102] Broadcasting Act, 1968, section 2.

[103] Ibid., section 15. For a dissenting opinion on the workability of implementing public policy goals for the media, see Edwin Black, "Canadian Public Policy and the Mass Media," Canadian Journal of Economics, 1968.

respecting the character and amount of advertising, the standards of programmes and the allocation of broadcasting time and other facets of broadcasting.[104] By the Act, a "broadcasting undertaking" requires a licence from the CRTC and such undertakings include "broadcasting transmitting undertaking[s]," "broadcasting receiving undertaking[s]" and "network operation[s]."[105]

In the above, CATV is classified as a "broadcasting receiving undertaking" and as such is subject to the preamble to the Act of section 2. However, there is still some debate as to the responsibilities imposed upon the private sector of Canadian broadcasting, this sector being comprised of both CATV and private television stations.

Section 2(g) clearly applies only to the CBC. The debate centres around section 2(b). One may argue that Canadian ownership of broadcasting undertakings under this section is sufficient to ensure the enrichment and strengthening of the cultural, political, social and economic fabric of Canada; or one may argue that the last phrase is one of the goals of broadcasting in Canada and ownership is one means of attaining this goal.

Section 2(d) clearly imposes Canadian content requirements on the private broadcasting undertakings, but there is

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[104] Ibid., section 16.

[105] Ibid., section 3.

no requirement that this content contribute to the strengthening of the fabric of Canada. If the only responsibility toward this end given to private broadcasting undertakings is a minimum Canadian content requirement , it might appear that CATV under the Act is given the freedom to import U.S. channels after provision has been made for either (a) the carriage of all available Canadian alternate channels or (b) the maintenance of some minimum ratio of Canadian to U.S. channels.

There is finally, however, a provision in section 2(h) which probably allows the CRTC almost unlimited discretionary power in the regulation of CATV. This section states:

> Where any conflict arises between the objectives of the national broadcasting service and the interests of the private element of the Canadian broadcasting system, it shall be resolved in the public interest but paramount consideration shall be given to the objectives of the national broadcasting service.[106]

It has been said that Canadians have been traditionally worried about two things--first, the domination of the economy and culture by Americans, and second, the fear that someone will try to do something about it. In its brief history of cable regulations, the CRTC has become well aware of both concerns.

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[106] Ibid., section 2(h).

It seems that in regulating CATV, the CRTC has been concerned with two closely related yet philosophically diverse problems. During the first two years of the development of cable policy, the CRTC seemed to believe that both problems could be treated with the same policy pronouncements, but evidence has been presented in this chapter to show that such may not be the case. The first problem is the protection of broadcasters and the preservation of the over-the-air broadcasting system in the face of U.S. competition. The second problem is to minimize the inroads of "American cultural imperialism" caused by the growing availability of U.S. television in Canada. The policies used in attempting to solve both problems involved limiting the number of U.S. channels that CATV systems could carry. However, such policy did not contribute to the solution of either problem, and in regard to the first may even have been perverse.

Canadians have long cherished the idea of their own, distinctive broadcasting system.[107] The popular outcry against CRTC cable policy doubtless stemmed from one of the following hypotheses:

(a) Canadians did not believe that broadcasters were in financial trouble owing to CATV. If they had believed

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[107]Frank Peers, The Politics of Canadian Broadcasting 1920-1951 (Toronto: University of Toronto Press, 1969).

CATV could cause a deterioration of Canadian broadcasting service, they might have been more receptive to CRTC policy.

(b) Canadians did not feel a threat existed to their cultural heritage deriving from the influx of U.S. signals.

(c) Even if Canadians felt that U.S. television could make them less "Canadian," it was felt that it was to the individual and not an independent governmental regulatory agency to make the choice as to whether to undertake this risk by watching U.S. television.

Due to public pressure then, the CRTC has been forced to reverse its stand on cable and develop an entirely new ethic for cable policy. Outlined below is a short summary of the history of CRTC cable regulation beginning with the first public policy statement released on May 13, 1969.

1. May 13, 1969 Public Announcement--"Community Antenna Television"

The Commission announced an order of precedence of channels to be carried by CATV systems, which was:

(i) CBC French and English networks

(ii) Private Canadian networks

(iii) Independent Canadian stations

(iv) Local and educational programming (i.e., cablecasting)

(v) Non-Canadian television stations

(vi) Duplicate channels.

With regard to (iv) the Commission stated that "CATV local programming should complement, rather than compete with, programming already available to the community through television and commercial movie houses."

In addition, there was to be no alteration of the programming received from broadcasting stations, and cable systems were not to be allowed to carry their own commercials.

The Commission indicated it would not consider licences that would result in over-wiring and would not approve large networks of CATV systems. The CRTC further stated that it would pay close attention to rates charged and approval of the Commission had to be obtained before rate adjustments could be made.

2. Public Announcement July 10, 1969 "On the Licensing of Cable Television Systems"

The Commission indicated its preference for a fragmented cable industry feeling that it "would serve the public interest better to leave room for a larger number of persons and companies to play a role in this type of enterprise. . . . In this regard, the Commission has tried, as far as possible, to relate natural and community boundaries with CATV system boundaries. The Commission has, whenever possible, also favoured local ownership."

3. Public Announcement, December 3, 1969 "Licensing Policy in Relation to Common Carriers"

The Commission announced that except in exceptional cases, common carriers would not be allowed to hold CATV licences.

4. Public Announcement, December 3, 1969 "The Improvement and Development of Canadian Broadcasting and the Extension of U.S. Television Coverage in Canada by CATV"

In this announcement, the Commission expressed for the first time its concern over the adverse impact that CATV could have on broadcasters:

> The problem facing the Commission is not whether the technology of microwave should be used to help the development of cable television. It is to decide whether the use of additional techniques should be authorized to enlarge the coverage area of U.S. networks and U.S. stations and therefore their advertising markets in Canada.
>
> The rapid acceleration of such a process throughout Canada would represent the most serious threat to Canadian broadcasting since 1932 before Parliament decided to vote the first Broadcasting Act. In the opinion of the Commission, it could disrupt the Canadian broadcasting system within a few years.
>
> The fact that through force of circumstances many U.S. stations now cover other parts of Canada, and that some of them seem to have been established mainly to reach Canadian audiences does not justify a decision of the Commission which would further accelerate this process.
>
> In consequence the Commission will not license broadcasting receiving undertakings (CATV) based on the use of microwave or other technical systems, for the wholesale importation of programs from distant U.S. stations and thereby the enlargement of the Canadian audience and market areas of U.S. networks or stations.

> However, the Commission feels strongly that no part of the Canadian population should be penalized in order to preserve a theory or to protect vested interests: either financial interests of investors in private broadcasting or privileges accumulated by particular groups in public broadcasting. The Canadian broadcasting system is worth safeguarding only if it provides the Canadian population with essential services which could not be provided otherwise. It would not make sense to protect a Canadian system based essentially on the retailing of programs "using predominantly non-Canadian creatives [sic] and other resources." Certainly Canadians should not be denied access to the best material available from other countries. Any broadcasting system must remain constantly open to ideas coming from other parts of the world. Nevertheless the efforts of Canadians to maintain an independent broadcasting system can be justified only if this system achieves the high expectations established by Parliament in the Broadcasting Act of 1968.
>
> The Commission is of the opinion that the Canadian broadcasting system, whose development the Commission must regulate and supervise, must now improve rapidly or risk disappearing as a system. . . .
>
> This decision rests on the conviction that there is in Canada the talent and the ability in the various fields of expression and knowledge to make effective use of a complex communication system. Broadcasting in Canada can and must express the originality of Canada and Canadians. [Italics mine.]

With this announcement, the Commission offered broadcasters a carrot while threatening them with the stick. The ban on microwave meant broadcasters had a good deal of uncertainty removed and would thus be able to plan well into the future. In practice, this meant many stations would not have to face CATV competition at all (especially stations in the Maritimes, the Prairies, and Northern Ontario and Northern British Columbia) since CATV does not appear to be viable without U.S. signals.

At the same time, the CRTC hinted that if Canadian television did not respond, at some future date it might throw broadcasting open to market forces. The Commission indicated that it did not intend to preside over a war between private broadcasters and cable companies as to who had the right to import American television programmes.

And throughout the announcement was a continuation of the theme that had been established in the Aird Report in 1929 and confirmed with each successive study on broadcasting, that Canadian broadcasting was more than a mere entertainment medium. If that were all it was, perhaps U.S. incursions would not be undesirable. But, as a medium charged with strengthening unity, culture and education, it must remain Canadian.

5. Public Announcement, February 12, 1970 "Proposed Amendments to the Radio (TV) Broadcasting Regulations"

Consistent with its December 3 announcement, and in an effort to force broadcasters to develop a distinctly Canadian television industry, the CRTC declared that a maximum of 40% of the broadcast time could be devoted to non-Canadian programmes, with the programmes from any one country not to exceed 30% of the broadcast day. The same Canadian content requirements were to be in force between the hours of 6:30 pm to 11:30 pm, as well as the broadcast day as a whole. For private broadcasters, the full minimum content requirements

were to be reached by September 1, 1971, while the CBC was to reach this minimum by September 1, 1970.

In response to these new regulations, the CTV network commissioned the Woods-Gordon study, which showed that each hour of U.S. programming would reduce revenues and raise expenses.[108] As will be seen shortly, this study, and a similar one commissioned by the CRTC itself, caused the CRTC to back-track somewhat.

6. Public Announcement, April 10, 1970 "Guidelines for Applicants Regarding Licences to Carry on CATV Undertakings"

The Commission termed this announcement as only "a guide to applicants for licences, amendments to licences and renewals of licences to carry on CATV undertakings," whereas the announcement on May 13, 1969 was called "policy by which it [the CRTC] will be governed in supervising this sector of the Canadian broadcasting system." It would appear that the CRTC was becoming more aware of the complexities of the cable problem and the difficulties of regulating broadcasting.

With this announcement, the CRTC proposed the following guidelines:

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[108]The Nesbitt-Thompson study estimated that each such hour would reduce revenues by 50% while costs would rise by 200%. Op. cit., p. ii.

(a) In granting a licence, the CRTC could require that the number of channels to be carried on the CATV system be reduced.

(b) The Commission issued a new list of priorities for determining the channels to be carried by CATV systems--either with a local head-end or distant head-end connected to the distribution system by microwave, which was:

(i) CBC network service

(ii) Canadian private network service

(iii) Canadian B contour stations

(iv) A channel for community programmes

(v) Canadian stations with significantly different programme schedules from those stations in categories (i) and (iii), such stations to be determined by the Commission

(vi) One non-Canadian commercial station

(vii) One non-Canadian non-commercial station.

(c) The Commission stated it might authorize a CATV system operating with a local head-end to carry programmes from more than one non-Canadian commercial station.

(d) The non-Canadian programmes broadcast by Canadian broadcasting stations carried by the CATV system were not to be duplicated on the CATV system either simultaneously or within 7 days of broadcast on the Canadian station.

(e) CATV systems had to provide one channel for the distribution of educational television programmes, and in certain areas a second local programme channel had to be used for broadcasting in the second official language of the area.

(f) Advertising of programmes prohibited by Canadian law were not to be carried.

(g) CATV networks might be authorised if the Commission felt such were in the public interest.

(h) "Applicants should bear in mind that if a TV station solicits Canadian advertising outside of his market or licensed area so as to disrupt the economic balance established by the normal licensing practice, the Commission may refuse to authorize the distribution of its programs by a CATV system."

The above guidelines showed the CRTC in its most protectionistic posture. Nationalists applauded the announcement, sensing that the age-old self-image of Canadian Liberal governments--that of presiders over the orderly take-over of the Canadian economy--had been reversed.[109]

"The Commission has been facing a dual responsibility concerning the orderly development of the broadcasting

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[109]Donald Creighton, Canada's First Century (Toronto: Macmillan, 1970), especially pp. 67-78.

system. On the one hand, it must encourage the orderly development of the broadcasting receiving undertakings, and on the other, it must guard against the disruption of the existing system. The responsibility then is to ensure a development of CATV that is a complement to the present system, rather than competition for it."[110] Thus the CRTC attempted to foster CATV development by sanctioning microwave for areas in which U.S. signals were unobtainable otherwise, and to protect the over-the-air broadcasters by restricting such signals to one in number.

However, cable operators and the general public objected vociferously, sensing that all CATV systems might be restricted to one U.S. commercial channel, even in areas in which several such signals were available off-air. One would suspect that the CRTC realised that such a regulation was politically impossible; however the threat did exist in the announcement.

The other point worth noting in the guidelines is that the CRTC was attempting to fill the cable spectrum with all types of Canadian channels, including Canadian duplicates.

7. Public Announcement, May 20, 1970 "Decision CRTC 70-99"

The Commission extended its deadline for the Canadian content requirements until October 1, 1972 for private

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[110]CRTC Annual Report 1969-70, op. cit., p. 43.

broadcasters, with interim content requirements somewhat lower.

8. Public Announcement, February 26, 1971 "The Integration of Cable Television in the Canadian Broadcasting System"

Again, the Commission re-iterated its duty of protecting the broadcasting system which it confirmed as the central nervous system of the nation, and re-expressed its apprehensions regarding CATV:

> In raising these issues the Commission emphasizes that the purpose is not to safeguard vested interest or maintain a technology that would have outlived its usefulness. The purpose and mandate of the Commission is to uphold the public interest and to safeguard the system, which, in the considered opinion of the Commission provides the best service for the largest number of Canadians. . . .
>
> If a solution is not found to integrate cable into the overall system, the impact, by fracturing the economic basis of the private broadcasters would . . . disrupt the Canadian cultural, educational and informational imperatives of both the public and private sectors of the Canadian broadcasting system.
>
> At stake is more than a system of national communications, because broadcasting also has the vitally important task of identifying and strengthening cultural entities, regional identities and community loyalties.

Having stated the above, the Commission then completely repudiated its own guidelines in the April 10 announcement by saying that "Although some measure of direction [given by the CRTC in regard to the amount and speed of cable growth] may be inevitable, the Commission is of the opinion that it would be much better for the viewers and for the Canadian broadcasting system if restrictive measures could be avoided."

With this, the Commission stated its over-all CATV philosophy as attempting:

> to develop a policy which would integrate cable television into the Canadian broadcasting system, avoid disrupting the system, enhance the capacity of the system to produce programs, and finally permit a vigorous development of cable television and of the whole Canadian broadcasting system.

The CRTC then listed a variety of means by which the cable industry might be integrated into the broadcasting system and requested comments and briefs on these methods. The ways of achieving this included:

(i) common ownership of broadcasting and CATV

(ii) mutual support without common ownership through compensation paid by cable operators to broadcasters

(iii) licensing of existing broadcasters to instal new transmitters which would carry the U.S. networks

(iv) rely on cable entirely for carriage of all programme services to all homes--the wired nation concept

(v) black-out duplication of programmes from distant stations

(vi) require cable operators to delete the commercials from U.S. television, and possibly replace them by Canadian commercials.

From the above it is evident that the CRTC had abandoned its plan of limiting the number of U.S. channels on cable by outright fiat. However, the concept existed in the document under the possible use of a sliding disincentive-cable operators would pay more for each additional U.S. channel carried.

Due to political pressures and public resentment the CRTC, then, had shifted from a protectionist stance to that of a system planner.

9. Public Announcement, July 16, 1971 "Canadian Broadcasting, 'A Single System'"

In the latest CATV policy announcement, the Commission revised its list of priority channels to be carried by CATV:

(i) all Canadian grade-A contour stations--"local stations"

(ii) all Canadian grade-B contour stations, except for private affiliates forming part of the same Canadian networks as a local station--these are "regional stations"

(iii) if available, a CBC owned and operated station must be carried, even if not included in priorities (i) and (ii)

(iv) any Canadian station whose grade-B contour does not cover the licensed area and which is not affiliated to the same network as the local or regional stations--these are "distant stations"

(v) all other stations are optional "and may be carried if all basic services are provided for."

This list of priorities differs chiefly in two ways from the priority list of the April 10, 1970 announcement. First, CATV systems are now required to carry a Canadian grade-B contour station only when such stations differ in their network affiliation from the local stations, whereas previously all grade-B stations were to be carried.

Second, once the minimum of Canadian channels are carried on the system, the CATV operator has complete freedom as to how he fills out the balance of the capacity of his cable system. This is in contrast with the previous announcement which threatened to limit American channels to one commercial and one non-commercial station.

The CRTC reiterated its desire that cable systems programme directly for the communities in which they are located. Some limited amount of cable networking was to be allowed when this did not substantially inhibit the local character of the cablecasting channel.

The Commission announced its plan for the compensation of broadcasters by cable operators. In the broadcasting--CATV relationship, there are two types of externalities. The negative externality arises because cable operators damage the revenues (or may damage revenues at some future point in time) of broadcasters through the use of broadcast signals. The positive externality arises from the fact that

broadcast signals are free goods, and CATV companies are able to trap these free goods, sometimes improve them, and resell them. It was this second (positive) externality that CRTC emphasised in giving the rationale for their compensation plan. To rationally weight all costs and benefits, however, both types of externality should be taken into account.

The Commission urged broadcasters and cable operators to negotiate a workable plan for compensation. The CRTC suggested a plan whereby the amount of compensation would be determined by a formula based on revenues, the percentage of revenues to be paid broadcasters to increase with revenues. In return, CATV operators would have permission to replay programmes on their systems that had been already aired by the broadcasters. CATV operators could also use some of these pre-determined funds to purchase programmes from other sources, such as the National Film Board.

The Commission believes that total compensation from this plan could have reached $2 million for the year ended August, 1970 and might amount to $4 million for the year ended August, 1972. It further added that of the total advertising revenue received by <u>stations</u> (as opposed to networks) only 25% is available for programming after meeting other expenses. The CRTC feels that most of this new payment could be used for programme production.

By replaying programmes on CATV systems with the original advertisement intact, the Commission feels that Canadian programmes would become more attractive to advertisers. The purchase and replay of such programmes additionally would attract new subscribers to the cable systems, thereby raising revenues, a portion of which would find its way into the broadcasting system. Such a plan would also stop the economic waste of only using programme material once.

In an effort to remove the deleterious effects of audience fragmentation through the reception of duplicate channels, the CRTC stated that all CATV systems with over 3,000 subscribers and more than 40 subscribers per mile of plant must be prepared, as of September 1, 1972, to respond to the request by a high priority station to delete the transmission of any lower priority station or optional station during any period for which these stations duplicate the programming of the higher priority station. The cable system may then elect to substitute the transmissions of the higher priority station into the otherwise vacant channels during the period of duplication.

The Commission withdrew its requirement that signals should be unaltered by CATV. Instead, it now opened up the opportunity for cable systems to make contractual arrangements with Canadian broadcasters to insert replacement

advertisements into the times occupied by advertisements on American stations, such substitute advertisements being sold by Canadian television stations. The CRTC deemed the total deletion of advertisements on U.S. channels to be too expensive for the cable operator, and instead allowed this option. Such policy, the Commission added will not lessen in any way the variety of programme fare available to cable subscribers.

Finally, the CRTC relaxed its policy on microwave. It stated it would authorise cable systems to import up to three U.S. commercial signals by microwave or other electronic means, and any number of distant Canadian signals. In practice, it felt, the use of microwave would be limited by the high costs involved.

The evolution of CRTC policy is clear. In the first announcements, the Commission did not appear to be much aware, or at least much concerned, with the negative impact CATV could have on broadcasters.

Once this impact came to be realised, with its ramifications on the broadcasting industry's performance, the CRTC became strongly protectionistic. It felt that by limiting cable growth through restricting the services that CATV could provide, it could protect broadcasters from destructive competition, while at the same time saving the nation's television screens from complete domination by the United States.

However, through a combination of public outcry and realisation that in an age of communications satellites and the laser, protectionism in communications is necessarily a short run policy alternative, the CRTC changed its philosophy. Instead of protecting broadcasters against competition by placing restrictions on cable's services, the Commission decided to use cable and cable's resourses to improve broadcasters' performance so that broadcasters might be able to compete more effectively.

While a minimum Canadian service is still required of CATV firms, by and large they are given free rein as to the services they are allowed to provide. Now, instead of trying to limit the demand for cable, the CRTC has concentrated on the supply of cable, for most of the policies given above have the effect of substantially raising the costs of cable operators. However, the philosophy behind these increased costs is economically efficient and has the effect of neutralising externalities. Other parts of the policy have the effect of protecting broadcasters without any decrease in the cable services provided.

10. Public Announcement, March 10, 1972

With this announcement, and due to pressure from the private broadcasters, the CRTC relaxed its Canadian content requirements for the private sector of Canadian broadcasting. The new requirements for all privately-owned stations are,

then, a minimum of 60% Canadian programming over the programme day and a minimum of at least 50% "in any recognised period of the broadcast day" (e.g., prime-time). In addition, the rule limiting the percentage of programmes that could be imported from any single country were dropped.

In return, the CTV network was expected to improve the quality of the programming it actually did, to extend its service, and to re-organise its corporate structure in such a way that the eight largest members would subsidise both the network and the six smaller affiliates.

These revisions are now scheduled for an early public hearing before they become regulations.

By reflecting on the results obtained in this chapter, it is now possible to offer policy suggestions and a critique of CRTC policy. By the equations developed in section III of this chapter, it has been determined that a station's viewing share is affected unequally by different classes of stations. It was found that the number of U.S. alternate stations available will have the largest impact on the viewership of a local station.

Significantly, however, the number of U.S. duplicate channels available has only a negligible effect upon the audience share of the local station. It has also been found that advertisers are most concerned with the reach of a station, and only secondarily concerned with its viewing

time. Once a U.S. station approaches or exceeds the reach of the local station, the latter's revenue drops sharply. This observation is in large measure due to the existence of the U.S. multinational corporations in the Canadian branch-plant economy. Therefore, given that the CRTC is concerned with strengthening the financial viability of the Canadian broadcasting system, and at the same time promoting CATV growth, the CRTC should consider regulations that ensure that as many American channels are duplicated on the cable as is possible. This will fragment the Canadian audience for the U.S. channels without reducing the audience for the Canadian channel. The U.S. channels will then become non-viable as advertising mechanisms with which to reach the Canadian market.

Throughout the CRTC's history of cable regulation, it has shown a fear of allowing into Canada too many U.S. signals. In its announcement on April 10, 1970, in fact, the Commission showed a desire to limit the number of U.S. commercial channels to one in number. This may easily be the worst possible situation if promotion of Canadian television is the desired goal. Table IV-11 shows that a single U.S. channel on cable may be expected to attract 20-30% of the total viewing time, depending upon the number of Canadian channels also on the cable. With this viewing share the American station would become an excellent advertising vehicle for the multinationals. This hypothesis

is documented by the KVOS experience. That a Canadian channel remains a viable advertising vehicle when facing numerous U.S. channels is shown by the CFPL experience.

However, it has also been shown that the successive addition of alternate U.S. stations has a continuing strong impact on the Canadian channel. Some evidence exists that their marginal impact may decline slowly as the number of these channels becomes larger. Therefore, in accordance with the findings of this study and the CRTC's stated policy of promoting the Canadian broadcasting system, it appears that the CRTC should maintain control over the types, rather than the total number of U.S. channels being carried. In this light the CRTC may wish to vary the number of such alternate channels that may be carried on a CATV system according to the financial strength of the local station, but it may wish to fix the maximum number at three. Where possible, the CRTC could demand that each alternate U.S. channel be accompanied by a second U.S. station of the same network affiliation.

In the most recent cable policy announcement, the CRTC has limited the total number of U.S. channels that may be microwaved. The present study indicates that the CRTC may wish to withdraw this rule and replace it by a regulation that places a limit of three alternate U.S. channels on CATV systems and that these alternates must be accompanied by at least one or two U.S. duplicates.

The number of Canadian duplicate channels was also found to have a substantial impact on CBC affiliates. The new CRTC policy of deletion and substitution of such channels when carrying the same programmes seems to be in accord with its goals. The former CRTC policy of forcing the carriage of all such duplicates with grade-B contours in the area was perverse since it fragmented audiences without an increase in viewer choice.

As stated earlier, multinational corporations account for 75% of the national advertising in Canada. Presently, Canadians only view U.S. channels for about 18% of the total Canadian viewing time. Thus, these multinational advertisers have not yet found it propitious to abandon the Canadian system and to rely wholly on the over-flow viewing of U.S. stations. The policy suggestions given above should help ensure that the local station retains the predominant position in its own market. However, if felt desirable, steps could easily be taken to ensure that the Canadian system as a whole is able to retain its share of the multinational corporations' advertising budgets. This would be an attempt, then, to maintain a high degree of network advertising as opposed to national selective advertising.

If the total audience for Canadian television stations drops to 50 or 60% as may be expected if all urban areas, including the very smallest, are able to receive 3 U.S. channels via cable, total advertising revenues to Canadian

broadcasting may be expected to decline sharply, due chiefly to a fall in network advertising.

Canadian Dimension, in its brief to the Special Senate Committee on the Mass Media made the following point.

> . . . Now and in the future, American broadcasting should not be allowed to take money out of the Canadian advertising pool. Accordingly, in cross-border cablevision and satellite reception, advertisers whose products sell in Canada should be charged, on the basis of ratings, the full advertising rate for Canada . . . [such] revenue . . . to go to Canadian broadcasting. The charge can be collected from subsidiaries or as a customs fee on imports. If, to pick one current example, Gulf Oil did not want to pay the charge because none of it would be going to the American network and station which originated the sponsored program, then it could always change its name in Canada to British-American, and advertise under that name here.[111]

Such a proposal appears to be the only solution that would retain these advertising dollars for Canada while Canadian viewing-time declines.

In attempting to partially deal with this problem, the CRTC recommended that Parliament change Section 12a of the Income Tax Act to include broadcasting.[112] As this section currently stands, Canadian corporations are permitted to write-off as a business expense all advertising in Canadian publications, but are not granted this right when advertising

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[111] "Canadian Dimension Brief to the Senate Hearing on the Mass Media," Canadian Dimension, Vol. 7, Nos. 1 and 2, p. 37.

[112] Canadian Broadcasting "A Single System," July 16, 1971, p. 29.

in foreign publications (except for Time and Reader's Digest that is.[113]

However, as the CRTC itself realised in an earlier policy statement, revision of the Income Tax Act in this manner would not solve the problem since this "Canadian statute could have [no] effect on an American company which would buy time on an American television station in order to reach a Canadian audience, even though this would be made possible by the intermediary of Canadian cable companies.[114]

In actual fact, such a policy might have a deleterious effect on the economy as a whole. While the subsidiaries in Canada would still be able to reach the Canadian market via U.S. stations by simply shifting the advertising expenses to the parent company, the wholly-owned Canadian competitor will not have this advantage. If this ability of subsidiaries to shift advertising budgets in this way gives such companies an important competitive advantage over their Canadian competitors, the result may be even more American take-overs. However, this policy, if adopted, should return some of the estimated $12 to $15 million spent on U.S. t.v. by Canadian advertisers.

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[113]For a summary of the pressures brought upon the Canadian government by Washington in order to win these two exemptions see Peter C. Newman, The Distemper of Our Times (Toronto: McClelland and Stewart, 1968), pp. 224ff.

[114]CRTC "The Improvement and Development of Canadian Broadcasting and the Extension of U.S. Television Coverage in Canada by CATV," December 3, 1969, Appendix 4, p. 17.

The CRTC also attempted to cope with this problem by proposing that local stations negotiate with the CATV companies to sell advertising during periods in which the U.S. station is carrying commercials. The CRTC realised that the switching and monitoring required would be quite expensive so left responsibility for meeting these costs to the television station.

There are at least one, possibly two, additional problems with this proposal. In the first place, the Canadian television stations would have to obtain advertising for substitution on the U.S. channels. However, in large part, such advertisers will be the same multinational corporations who have up until now been benefiting from this over-flow exposure. Such advertisers may realise that the net gain of blacking out such commercials and substituting them with another simply raises costs without increasing reach. Much will depend upon whether these corporations are able to close rank and boycott such substitution. At any rate, to the degree that the CRTC can become successful in fragmenting the U.S. television audience in Canada as suggested above, the revenues obtained per minute of such commercial substitution would be only a fraction of the revenues per minute of advertising on Canadian channels. Therefore, it is very much open to question whether any large increase in funds would be forthcoming from this proposal.

The second question is much more difficult. Leland Johnson, in analysing the Federal Communications Commission's proposal in the United States for commercial substitution found that such a policy may have built-in perverse incentives. He states:

> One can argue that incentives would be blunted because the large potential revenues (at least in some markets) from commercial substitution would (a) distract broadcasters away from their responsibilities in local broadcasting and toward the more remunerative task of selling advertising on distant signals, and (b) attract into the industry entrepreneurs who have no deep interest in local broadcasting, but who wish to establish their "rights" to commercial substitution.
>
> . . . With the future of UHF [read Canadian television] not being all that bright (he might reason) and with advertising on distant signals so profitable, why not simply continue doing a token job of local broadcasting and live off the distant signals?[115]

If Johnson's hypothesis were to hold true in Canada, it would be due to the co-existence of two factors for the station so induced to not perform. Clearly, the station would have to be marginal and with little hope for turning a profit in its own operations, and also the amount of such substitute advertising would have to be much greater than one might suspect a priori.

However, there are pressures working to actually increase performance under this plan. Johnson points out that the regulators "can more easily encourage or force the

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[115]Leland Johnson, Cable Television and the Question of Protecting Local Broadcasting (Santa Monica: RAND, 1970), R-595-MF, pp. 8, 9.

station to do a better job in local broadcasting precisely because it does enjoy large revenues from an independent source."[116]

There is a different and theoretically more interesting incentive at work here also. It stems from the economic theory of broadcasting. It has been established that under oligopoly conditions, there are strong incentives for each oligopolist to duplicate the programming of its competitors. In television financed by mass advertising and driven by the profit motive, diversity in programming does not commence until the audiences for the most popular types of mass programming become fragmented to such a point that minority programming will attract an expected audience share greater than would duplication of the programming on other stations.[117]

Under the CRTC proposal, however, the private Canadian broadcaster will be obtaining revenues from the U.S. style programming through the commercial substitutions. This may induce him to programme on his own station more distinctly for the Canadian audience. Were he to concentrate on his own channel with U.S.-style pop entertainment shows he would find that he was competing with all the U.S. stations in the area, including his "own."

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[116] Ibid., p. 9.

[117] See P. Wiles, "Pilkington and the Theory of Value," op. cit., and other references in footnote 61 of the chapter.

For example, suppose there were two U.S. channels available, with equal Canadian audience shares, one of which the Canadian station is using to substitute its commercials. Denote these stations as US-CTV and US-2, and give them 60% of the Canadian audience (without considering the private station's share). Assume there is one CBC-owned and operated station programming exclusively material designed for the special interest of the Canadian audience and that it receives 40% of the viewing time. The viewing shares of the three stations are:

US-CTV	-30%
US-2	-30%
CBC	-40%

Now, the private Canadian station, denoted by CTV, must decide how to best compete with the other three stations; if it were to compete exclusively on the basis of carrying US-style programmes, the expected audience shares would be:

US-CTV	-20%
US-2	-20%
CTV	-20%
CBC	-40%

The CTV station's total saleable audience (US-CTV plus CTV) is 40%. If, however, it decides to compete by offering material of exclusive concern to the Canadian audience, the shares would be:

US-CTV	-30%
US-2	-30%
CTV	-20%
CBC	-20%

The CTV station's total saleable audience in this case is 50%. If the CTV station were allowed to sell time on both US stations, the increase in its saleable time would be even more pronounced should it decide to programme exclusively for the Canadian audience (60% vs 80%).

It will be noted that the permission given the CTV station to sell time on a single US station has increased its incentive to programme for Canadians. Were this permission denied, its expected audience share by broadcasting US-style programmes would be 20% and by broadcasting Canadian programmes would also be 20%. The cost saving from using US-style programmes determines which course would be taken.

The reader may confirm that this effect will hold for other combinations of U.S. and Canadian channels as long as there are fewer Canadian than American channels on the cable and there is a distinct Canadian audience that is unaffected by the addition of a large number of U.S. stations. The latter was found to be the case in equation 1-C. Also, the greater the number of U.S. stations for which the CTV station is allowed to substitute advertisements, the more

pronounced will be the effect. In addition, the station should be located in an area with heavy cable saturation.

While it is impossible to quantify this incentive effect, proponents of a distinctly Canadian system of broadcasting will find it comforting to know that cable television, through the importation of U.S. signals, may be used to improve the performance of Canadian stations.

The last major proposal of the CRTC was that cable companies compensate local broadcasters for services rendered. While from an economic efficiency point of view such a policy is desirable,[118] one may question whether the estimated $4 million per year would adequately improve the performance of broadcasting which has an annual budget of over $260 million.

One further source of untapped revenues would be the cable subscribers themselves. By subscribing to CATV in the first place, cable television subscribers have expressed a willingness to pay for additional television variety. For the U.S., McGowan and Peck estimated total surplus (i.e., the percentage of total income viewers would give up to obtain the stated number of channels rather than go without television altogether), and the marginal surplus of television[119] and the principle conclusion was that there was

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[118]See, for example, R. H. Coase, "The Problem of Social Cost," Journal of Law and Economics, 1960.

[119]Their estimates for the U.S. are given below.

a substantial under-investment in television programming. The same conclusions hold for Canada.

Were CATV subscribers subjected to a tax of $10.00 per cable outlet, per year, roughly 1/6 of the current subscription charge, an additional $10 million would be available for the Canadian system, based on the DBS 1969 subscriber data,[120] a figure that would rise yearly.

Were $10 million a year from this source added to the CRTC's estimate of $4 million in compensation payments, $12 million in recovered advertising of Canadian firms on U.S. border stations through revisions in the Income Tax Act

Table IV-33. Estimated Consumer Surplus From Various Levels of Free Television Service as a Percent of Total Income

Number of Stations	Total Surplus (%)	Marginal Surplus (%)
1	2.60	2.60
2	4.05	1.45
3	5.06	0.99
4	5.83	0.76
5	6.45	0.62

Source: John McGowan and Merton Peck, "Estimating Consumers' Valuation of Additional Television Programming from CATV Data" (unpublished, undated), p. 20.

[120]DBS, Community Antenna Television 1969, op. cit., p. 9.

and $24 million through taxing corporations who rely on the spill-over of advertising to reach the Canadian markets (or by the commercial substitution plan), the Canadian system would gain an additional $50 million a year, or an increase of nearly 20% of total revenues.

In actual fact, cable t.v. can present to the authorities a new way of completely controlling broadcasting in Canada. As long as the primary method of reception of television signals remains an outside aerial, the CRTC has no control over the U.S. border stations sending their signals into Canada and attracting a large audience. However, once cable becomes the predominant method, all signals are contained in a pipe, and the randomness of a signal emission is replaced by something that can be held in tight control. The amount of competition among Canadian stations may now be ordered much more effectively than before; the amount of U.S. competition can now be controlled whereas before it was subject to no control whatsoever and varied solely with geography. Indeed, for the first time, real planning may be introduced into the Canadian television industry.

The CRTC has only recently come to realise the potential this gives them to regain control over broadcasting. However, most observers are sympathetic to their efforts. They were coping with a problem that was very difficult and

the solutions for which were hardly obvious. In fact, the CRTC has gained a high measure of respect from many Canadians. They have attempted bold and controversial steps in the face of widespread opposition, whereas most regulatory agencies try to hide in the anonymity of inaction. They have been the tools of no one--their CATV restrictions caused much opposition from the cable industry, and their Canadian content requirements caused a good deal of resentment from broadcasters. And it appears that they are finally adopting a philosophy that will prove to be the most rational from both an economic and political point of view as well as being most effective in approaching the goals that Parliament has set for broadcasting in Canada.

I choose to close this chapter with a quote from Graham Spry, the individual who, more than anyone else, is responsible for having brought about a Canadian broadcasting system. His efforts 40 years ago led to the establishment of what is now called The Canadian Broadcasting Corporation. It seems appropriate to hear from him again in the 1970's when again a Canadian system of broadcasting is in a doubtful position.

> Because of cable we are moving from an age of relative scarcity of channels and choices to an age of expanding plenty. We almost messed up the great chance we had in radio and still more so in television. Technology offers us a second chance.
>
> The money is there. The method is acceptable. If we do not take advantage of the opportunity it

> may not ever return, and as long as we remain Canadians we will regret having failed to create our own distinctive broadcasting industry and left it to be shaped by the purposes of the huckster and the blind forces of the market place.[121]

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[121] Graham Spry, "A Plan to Make Our TV Canadian," Toronto Daily Star, February 13, 1970, p. 7. A detailed examination of Mr. Spry's activities in the Canadian Radio League is contained in Frank Peers, The Politics of Canadian Broadcasting 1920-1951, op. cit. On the history of Canadian broadcasting, see also Alexander Toogood, Broadcasting in Canada. Aspects of Regulation and Control (Ottawa: Canadian Association of Broadcasters, 1969), and Royal Commission on Broadcasting, 1957, Report, op. cit., pp. 297-317. The market place is "blind" in Canada for broadcasting since it does not take into account the social factor that Parliament has declared to be important.

CHAPTER V

CONCLUSION

The most apparent and reliable conclusion to be reached from the study herein presented is that cable television is a highly complex area of study, and this in face of the simple technology and relatively homogenous products associated with the industry. As often as not, the data analysed in one way would lead to conclusion A, while analysed in a different way would lead to conclusion B, both A and B generally being felt, a priori, to be mutually exclusive or contradictory.

Perhaps the greatest lesson to be learned from a study such as this is the danger that is involved in studying data solely from the vantage point of pre-conceived conclusions. Such danger is especially a cause for alarm when econometric model building is used as a technique of analysis without an accompanying intimate knowledge of the industry being studied. The greater the complexity of the field under study, it appears, the easier it is to arrive at erroneous, yet statistically significant, conclusions.

Cross-sectional data derived from the balance sheets of cable television companies disclosed that fixed investment per mile of CATV plant rose steadily with system length

while fixed investment per household passed by the cable fell as the number of households passed increased, the first finding leading one to believe that CATV was an increasing cost industry with the second leading one to believe that CATV was a decreasing cost industry.

Similarly, operating costs per mile were found to rise as attention was focused on successively larger and larger systems (at least for systems over 300 miles in length) whereas these same costs fell per potential subscriber.

These apparently contradictory findings can be resolved when it is realised that large cable systems exist in large municipalities in which the population density tends to be great.

Over-all annual costs (depreciation plus operating costs) were estimated at $1700 per mile for systems of 50-100 miles, $2300 per mile for systems of 150-400 miles, and $2900 per mile for systems over 600 miles in length.

Costs per subscriber were found to vary inversely with saturation. When firms attain 55-65% saturation, there is a dramatic fall in investment per subscriber ($140-$180 per subscriber vs. $70-$80 per subscriber). For low over-all annual costs, a minimum saturation of 30% was found to be essential. Low saturation firms, those with less than 30% of the houses passed subscribing to the system, faced costs of $40-$75 a year per subscriber; those with saturations between 30% and 50% faced annual costs per subscriber of

$35 to $50; high saturation firms faced costs per subscriber of $25 to $45.

From the detailed cost analysis developed in Chapter II and summarised above it was concluded that over-wiring was economically impractical under current cost conditions and under the limited demand for services of different types on the cable. It was also concluded that a policy whereby metropolitan areas were divided up among different cable systems was not economically inefficient unless the local cablecasting costs were so significant as to give large firms a cost advantage by spreading such programming costs over a large number of subscribers. The costs of cablecasting were not investigated. Finally, it was concluded that under current cost conditions and apparent revenue potentials, cable service will not be extended readily to rural areas. This finding indicated that traditional over-the-air broadcasting will have a significant role to play for some time to come. In order to solve the problem of extension of CATV service to rural areas the telephone companies have suggested that they be allowed to take over CATV functions and apply their system-wide averaging of costs in order to subsidise service to such areas. However, as discovered in Chapter III, current telephone company plans for installing coaxial plant in metropolitan areas are not to be implemented for ten to fifteen years. Therefore, one should not anticipate cable service in rural areas under any circumstances for at least a decade.

Chapter III discussed certain advantages to a cable policy that would designate the common carriers as the chosen instrument to implement broadband communications technology (some of which included avoidance of wasteful duplication of facilities, the convenience of the single wire, the ability to implement "corporate planning" in the absence of "chaotic" competition, the "orderly introduction" of service, and the ability of common carriers to cross-subsidise groups located less favourably). Certain disadvantages to such an approach were also seen (increased possibility for price discrimination, slow technological advance and delayed introduction of new services, the possibility of unfair competitive practices against firms on the periphery such as computer utilities and manufacturers of terminal devices).

The two-system approach was also discussed, whereby telephone and CATV would co-exist side by side and compete in areas in which their dissimilar technologies would allow. The major difficulty foreseen for this approach was that it could increase regulatory problems in that there would be a tendency on the part of the telephone companies to subsidise services in the competitive areas from profits earned in the monopolistic sector.

Advantages seen for the two-system approach included flexibility and the absence of the foreclosure of future services at a stage when none of the future services had

been offered, and a removal of some of the arbitrary power enjoyed by the telephone companies over inter-connections.

It was also seen that the telephone companies enjoy a great deal of regulatory control over CATV firms, in spite of the fact that they have been barred by federal law from holding a CATV licence. They held such private regulatory power over CATV before the passage of the Broadcasting Act in 1968 and have not relinquished this power since.

The major goal of these private regulators appears to be to prevent the growth of CATV as much as is possible. To this end they employ on occasion high construction and rental charges, prohibit all two-way use of coaxial cable, prohibit the transmission of non-broadcast material, disallow inter-connections and often prohibit the splitting of CATV systems so that schools, for example, cannot receive special educational programmes.

A discussion was presented to show how the telephone companies were enabled to maintain their private regulatory control over CATV even after the federal government had declared jurisdiction. The problem was found to stem from the fragmentation of governmental jurisdictional powers at two levels of government and among different agencies at a given level with the effect that no single governmental authority was responsible for sorting out the relations between the telephone companies and common carriers.

The monopoly corporation as the sufficient agent of the state for the implementation of communications policy was next examined. It seems reasonable to believe that the single corporation is no longer capable of implementing the complete range of communications technology that is possible in the 1970's. An analogy was drawn with the electrical power distribution system; in this case it is easy to see the enormity of the task that would be faced by the hydro companies were they given the mandate to develop all products and technology that can be attached to the power system. Similarly, now that communications technology is developing at such a rapid pace, (no longer is only one instrument, the telephone, plugged into the telephone distribution system) by leaving with the telephone companies authority to determine what shall and what shall not be attached to the message distribution system, a foreclosure of services and technology will probably result.

There are two basic ways of re-structuring the communications industry so as to allow the greatest degree of flexibility with regard to the introduction of new services. The first approach would be to break the vertical ties between the telephone message distribution system and the communications equipment suppliers (e.g., between Bell and Northern Electric). This procedure would allow the structure of the communications industry to approach that of the electric power industry wherein independent equipment suppliers are free to hook into the distribution system.

A second approach would be to allow CATV to compete on a parallel basis with the telephone companies for attachments to the system. This approach would of necessity involve the removal of the private regulatory control held over the cable television industry by the telephone companies.

It is also apparent that under current regulatory patterns and anticombines policy, neither approach will be implemented and technological change may suffer.

Chapter IV investigated the effects that CATV has on broadcasting in Canada. It was found that, with regard to viewing time of the Canadian system as a whole, the marginal impact of additional American channels was initially very high (e.g., the first U.S. channel will cause a predicted decline in viewing time of Canadian television of 20-25%) but declined as successively more U.S. channels were added (e.g., the fourth U.S. channel will cause a predicted 4-5% drop in Canadian television viewing time). By contrast, the positive marginal impact of additional Canadian channels tended to be quite constant and low (3-4%).

It was found that under similar circumstances, cable viewers exhibit viewing patterns very much similar to off-air viewers. For example, given equal channel availabilities, the former group tends to watch Canadian television only 3-6% less than the latter group and there is no significant difference between the two groups in the effects

of successively adding channels. Cable viewers do show a greater discrimination in the television they watch, however, as exemplified by the lower r^2's for the cable regressions. In other words, the number and types of channels available provides greater explanatory power for viewing patterns for the off-air group than it does for the cable group--this indicates that the "quality" of the stations available plays a larger role in determining viewing patterns for the latter group than the former.

It was found that CBC stations tend to be able to retain their audience shares better than CTV stations in the face of U.S. competition, but the CBC stations suffer from duplication of network programmes on the cable to a larger degree than CTV stations. It was also found that CTV has only an insignificant effect on the CBC viewing time, indicating that audiences may consider CTV affiliates to be good substitutes for U.S. stations.

While a statistically significant audience-revenue relationship can be shown to exist, in actuality reach or net weekly circulation is the most important explanatory variable with regard to station revenue. The importance of the audience-reach relationship is due to several factors, the most important being that audience surveys are undertaken only infrequently.

Generally, cable television was found not to have had a significant deleterious impact on broadcast revenues up to

the present time. This finding was attributed to the fact that cable has not yet substantially lessened a given station's reach. However, a danger exists that CATV may in the future cause a decline in these revenues if rating surveys come to be undertaken with greater frequency and when cable has a greater over-all saturation with the concomitant result that U.S. stations attain a greater over-all share of viewing time. In such a case, the multinational corporations, the principal advertisers on Canadian television, may find it propitious to reduce their advertising on the Canadian system and rely on the spill-over from American border stations.

Cable television was found to make more serious the problems private broadcasters encounter in meeting their obligations under the Broadcasting Act as enforced by the Canadian Radio-Television Commission. Canadian programmes are much more costly to Canadian stations than American programmes and they also generally attract a smaller audience. This means broadcasters also obtain less revenues from their own productions. However, Canadian content requirements are currently being tightened, which could result in a lessening of revenues and a substantial increase in expenses. At the same time, cable growth is expanding which will serve to fragment audiences further and perhaps eventually cause a decline in revenues. If such a decline were to take place, broadcasters could be forced into

reducing programming expenditures which could result in a decline in programme quality, thereby furthering the cycle.

From the above it should be apparent that an unregulated CATV industry in Canada could cause the collapse of the private sector of Canadian broadcasting. The CRTC has addressed itself to the task of integrating cable television into the broadcasting system in such a way that each may survive and expand. The empirical findings of Chapter IV could be of use to the Commission in this task. It is possible to use the existence of cable television and the availability of American signals in such a way as to strengthen the broadcasting system.

With a judicious selection of American and Canadian channels on the cables, authorities can effectively fragment the audiences to the U.S. stations in such a way as to ensure the predominant position of the Canadian stations, thereby maintaining the latter's viability as an advertising vehicle in Canada. The substitution of advertising messages by Canadian stations for those of the U.S. stations carried on the cable should result in the return of much of the lost advertising revenues of the multinational corporations. A tax on products advertised in Canada over U.S. stations would have the effect of returning these lost revenues also.

A laissez-faire cable policy, on the other hand, whereby cable operators are allowed complete freedom regarding channel choice, without any form of compensation (either

through commercial substitution or through direct payments by cable operators to broadcasters), would cause a substantial weakening in the financial resources of private broadcasting. In such an eventuality, the CRTC would be hard-pressed to enforce Canadian content requirements on private broadcasters as the latter's long run survivability would depend to an even greater extent than at present upon the relay of low-priced, high revenue-earning American programmes. Private broadcasting would then, of necessity, be exempted, by and large, from the goals for broadcasting as enunciated in the Broadcasting Act, viz. to "safeguard, enrich and strengthen the cultural, political, social and economic fabric of Canada."

What then can be concluded regarding cable television's role in influencing the broadcasting system as a whole in achieving the three goals set out for broadcasting by Harry Boyle and summarised in the Introduction as diversity in programme sources, creative freedom, and relevance to the Canadian social situation? Briefly, cable television possesses both the threat of completely destroying the system and the potential of incorporating itself into the system in such a way as to greatly assist the whole system in striving for the goals set for it.

The great abundance of channels that are associated with cable television means that the opportunity cost of television time is much lower than that for traditional

broadcasting stations; the latter are limited in supply in any given area due to spectrum scarcity and governmental policy and high costs. The actual expenses incurred in operating local cable channels are significantly lower than the costs of operating a traditional broadcasting station.[1] These reductions in both opportunity costs and actual expenses should serve to make for much easier access for different groups to television time, and thereby diversity in programming can be increased. And, of course, by its very nature in making available more broadcast stations to the public, cable should increase diversity. The danger that exists is that unregulated or poorly regulated cable television could cause such a severe financial strain to be felt by the traditional broadcasting system that the latter's service would decline to such an extent that diversity would be lessened.

CATV again offers the duality of a threat and promise to either suppress creative freedom or to enhance it. The threat arises from the financial impact unregulated or

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[1]See Harold J. Barnett and Edward Greenberg, "A Proposal for Wired City Television," Washington University Law Quarterly, Winter 1968, reprinted in The Radio Spectrum, Its Uses and Regulation (Washington: Brookings), 1968. For example, they state "As compared with $100,000 or more annual cost per channel for transmission over-the-air, it was estimated . . . that the annual charge by the common carrier per channel might be $15,000. Ibid., p. 22.

poorly regulated cable television could have upon broadcasters. The promise stems from the opportunities for new employment that CATV as a programme originator creates. When the concentration of employment opportunities is lessened, and consequently creative artists become less dependent upon any single employer, as happens with the expansion of local programming on cable systems, such artists are then less subject to the whims and capricious actions of employers and creative freedom is thereby enhanced.[2]

Finally, cable television can be regulated in such a way as to increase the capacity of Canadian broadcasting to "reveal society onto itself."[3] It can re-capture for Canada the advertising funds that have been syphoned off to the U.S. through the existence of the multinational corporations.

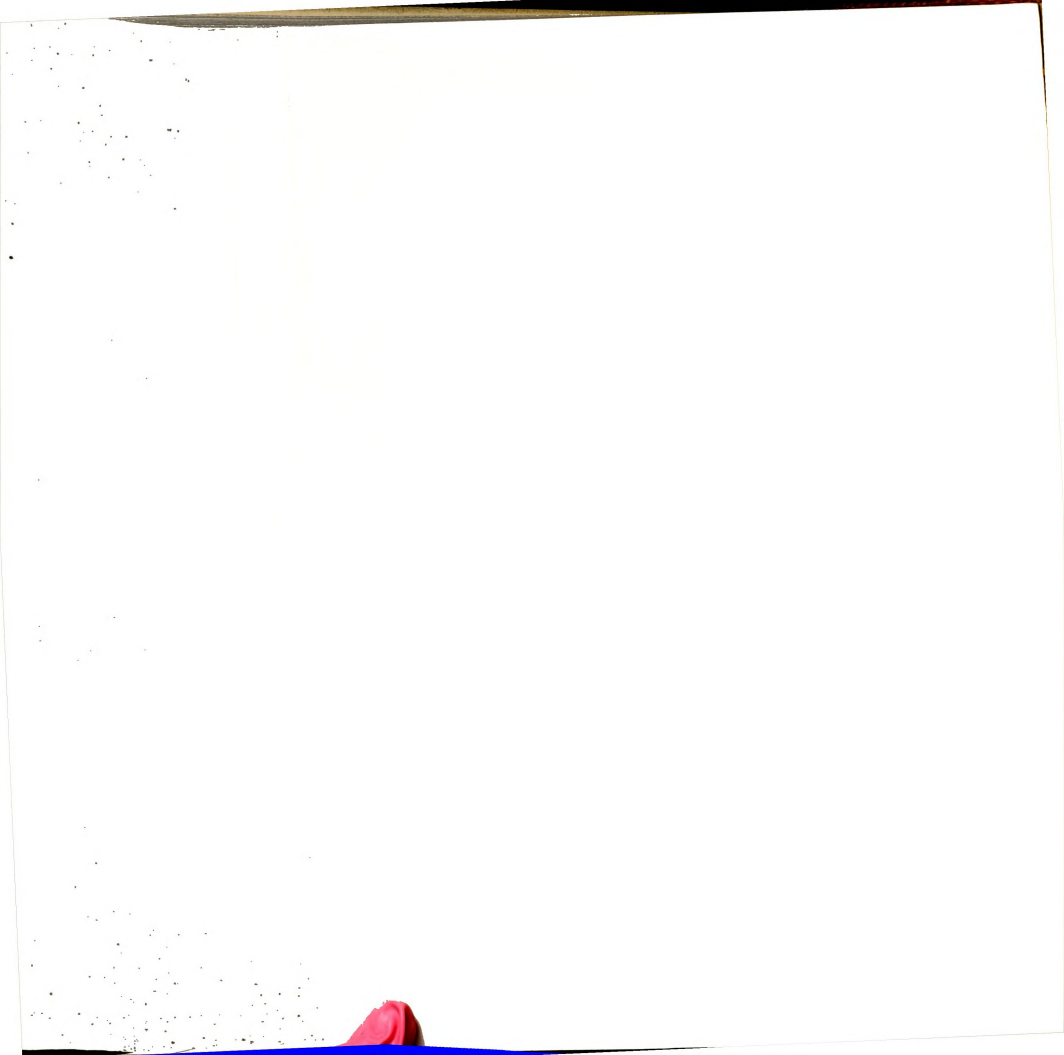
Perhaps the most significant finding of the study is that the encouragement of the growth of cable television so that it may assume a role as a wide-band telecommunications carrier in urban areas, in partial competition with the telephone companies, need not be in contradiction to a

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[2]See Peter Steiner. "Monopoly and Competition in Television--Some Policy Issues," The Manchester School, May 1961, p. 117.

[3]Harry J. Boyle, Responsibility in Broadcasting, A speech delivered to the Meeting on Mass Media, Trade Regulation Roundtable, Association of American Law Schools, San Francisco, California, Dec. 29, 1969, pp. 33. (Mimeo.)

policy of fostering the development of the Canadian broadcasting system. Both goals can be made quite compatible. There is little doubt that the CRTC had impeded cable growth up until the July 16, 1971 policy announcement. The new policy should allow, however, for the rapid expansion of cable service in Canada. With a healthy community antenna television service as its base of revenues, cable television may then expand, given suitable encouragement by the government, into a wide-band, intra-urban communications system. Such development, however, will be dependent upon some re-organization of the delineation of the regulatory authorities of governments at all levels as discussed in Chapter III.



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APPENDICES

APPENDIX A

THE STATUS OF CATV AS A PUBLIC UTILITY

(Appendix to Chapter II)

APPENDIX A

THE STATUS OF CATV AS A PUBLIC UTILITY
(Appendix to Chapter II)

Having undertaken an exhaustive analysis of the economics of cable television in Chapter II, it is now possible to compare the economic structure of cable TV to the more traditional public utilities. Left for discussion in the final three chapters are the more fundamental and important questions of what form regulation does and should take and what goals one should reasonably set out for CATV. For now, concern is focused solely on the hard realities of cost curves.

Cable television appears to meet most of the requirements usually set forth for public utilities:

(1) the service is supplied through a permanent physical connection between the producer and the consumer,[1] thereby raising the possibility of undue price discrimination.

(2) it is a natural monopoly,[2] since there are strong reasons for believing direct competition, if introduced, would be ephemeral.

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[1]Charles Phillips, The Economics of Regulation (Homewood: Irwin, 1969), p. 4.

[2]James Bonbright, Principles of Public Utility Rates (New York: Columbia, 1961), p. 8.

(3) There are social and political reasons[3] and cable television has a special importance and necessity.[4]

While the first two characteristics are generally recognised by CATV operators themselves, it is usually the third that they question. The first characteristic is self-evident, and the second has been established in Chapter II. However, even here, there are some dissenters in the industry, who manage to equate monopoly profits to a return for risk:

> There are all sorts of risks in the CATV industry. They generally relate to our lack of knowledge about the future. . . . If Oshawa turns out to provide a good return on investment--and this certainly isn't guaranteed yet--then, of course, the whole system has worked as its supposed to--someone has been rewarded for taking risk. It is not reasonable to come along at some later date and measure your return in relation to your then existing risk after many of the major risks have been surmounted--that is a kind of double jeopardy that is not in accord with our system of free enterprise.[5]

The above quote serves mainly to highlight the sophistry of some cable operators--being able to apply Knight's theory of profits to a natural monopoly.

The special social and political importance of cable arises, of course, from its effects on broadcasters.

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[3]Phillips, op. cit., p. 4.

[4]Bonbright, op. cit., p. 8.

[5]W. E. Jarmain, a prepared statement before the CRTC, undated.

Since broadcast regulation has been deemed necessary[6] due to the limited access that is technically permitted because of the spectrum scarcity, in order to make most efficient use of the broadcast spectrum the government must regulate fields related to and making use of broadcast signals. Unregulated cable could cause the demise of broadcast stations, thereby wasting a resource in limited supply.

This is, in fact the rationale used in Canada for the regulation of CATV. The White Paper on Broadcasting states:

> The new legislation will provide that community - antenna television systems shall be treated as components of the national broadcasting system, subject to licensing and control by the Board of Broadcast Governors. . . . Among the matters subject to regulation or incorporated in the conditions of a licence will be the inclusion of Canadian channels, the preservation of the integrity of the programs received and carried by the systems, the formation of networks, an adequate degree of Canadian control of corporate licensees, and . . . questions of multiple ownership or control.[7]

In the Report on the White Paper, the Broadcasting Committee concluded:

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[6]See, however, R. H. Coase, "Economics of Broadcasting and Government Policy," AER 1966 and "The Federal Communications Commission," Journal of Law and Economics, 1959; and Harvey Levin, "The Radio Spectrum Resource," Journal of Law and Economics, 1968. The thrust is that the spectrum is not in any more limited supply than any other resources, and once property rights are created, the situation will be controlled by the market.

[7]Hon. Judy LaMarsh, White Paper on Broadcasting 1966 (Ottawa: Queen's Printer, 1966), pp. 13-14.

> The Committee concurs with the proposals of the White Paper . . . we agree that they should be treated as part of the broadcasting system. While they do not at present use the airwaves, they nevertheless distribute broadcast programs which may compete with those of other broadcasting outlets and therefore, should be under jurisdiction of the BBG.[8]

By the Broadcasting Act of 1968, which created the Canadian Radio-Television Commission and brought cable t.v. under the jurisdiction of the federal regulatory body,[9]

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[8]House of Commons Standing Committee on Broadcasting, Films and Assistance to the Arts, Report on the White Paper on Broadcasting 1966 (Ottawa: Queen's Printer, 1967), p. 12.

[9]Before 1968, "such regulation of cable television as took place was a function of the Department of Transport and chiefly took the form of laying down technical standards. An important exception to the technical preoccupation, however, was the Department's concern in preserving the idea of local service, expressed in the rule on location of head-ends (within 10 miles of the area served) and the virtual ban on the use of microwave . . . the Department did not grant exclusive licences for any given area. A cable operator was subject to competition from other operators holding equally valid licences, and at least one cable operator ceased operating rather than face such competition." Canadian Radio-Television Commission, Cable Television in Canada (Ottawa: CRTC, 1971), pp. 8-10.

However, recently jurisdictional problems have come to the surface. See Douglas Fisher, "The Plot to Shut Out Quebec," Toronto Telegram, April 15, 1971, p. 20; Special Senate Committee on Mass Media, Mass Media, Volume II (Ottawa: Queen's Printer, 1970), pp. 360-362; and Association of Universities and Colleges of Canada, University Affairs, Vol. II, No. 1, Jan. 1970. The difficulties stem from the CRTC's control over broadcasting, the Department of Communications' control over telecommunications and technical standards, and the provinces' control (under the BNA Act) of education and cultural affairs. It is generally conceded that the federal government would lack power to regulate closed circuit systems that made no use of broadcast signals (Mass Media, op. cit., p. 361). See also the discussion on Tel Apart on page 97-8.

However, the debate arises from the CRTC's assumption of control over cable systems making use of broadcast

CATV is defined as a, "broadcasting receiving undertaking" (section 3(d) and,

> . . . broadcasting undertakings in Canada make use of radio frequencies that are public property and such undertakings constitute a single system herein referred to as the Canadian broadcasting system, comprising public and private elements . . . and . . . the objectives of the broadcasting policy for Canada . . . can best be achieved, by providing for the regulation and supervision of the Canadian broadcasting system by a single independent authority[10] (section 2).

It is apparent then that it was not the natural monopoly aspects of CATV, or the interconnection of suppliers and consumers that led to regulation, but the desire to maintain control over another field of endeavour. This is, no doubt, the reason that further public utility rate regulation has not (yet) been applied to CATV, even though CATV appears to meet the historical pre-conditions for such regulation.

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signals in areas unrelated to such useage--such as local programming, advertising, etc. Recently, Quebec Communications Minister Jean-Paul L'Allier announced that Quebec intended to give the Quebec Public Service Board the regulatory powers now exercised by the CRTC, due to the geographically restricted nature of cable (Toronto Telegram, April 8, 1971, p. 2). As Fisher, op. cit., puts it: "How could Quebec fail to respond to the threat of universality implicit in the wired city? Cable systems promise to be intrinsic in too much of life, including education, library resource centres, business, municipal billing, safety monitoring, etc."

[10] Broadcasting Act, 1968. As discussed in Chapter IV, p. 337 there is some dispute as to which sections of the Act apply to CATV and to private broadcasting, and which sections apply to the CBC.

The public utility characteristics of CATV are disputed, however. Douglas Webbink[11] erects five straw-men reasons for regulating cable television, and then attacks each in turn:

(1) cable t.v. may be a natural monopoly.

(2) protection of viewers or subscribers is necessary.

(3) protection of programme suppliers is necessary.

(4) protection of competing entertainment firms, such as non-connected television stations, theatres, may be necessary.

(5) protection of non-connected viewers may be necessary.[12]

Point number (1) has been dealt with at length in Chapter II. Webbink's point was that the natural monopoly aspects of CATV had not yet been established since there was no evidence that large firms faced lower costs than smaller ones;[13] of course the important question is how many firms can co-exist in a single area, and this Webbink admits is probably one. He dismisses this aspect of natural monopoly by recommending that exclusive franchises not be granted. The fact that my analysis has shown entry barriers to be very high means it is academic whether exclusive or

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[11] Douglas Webbink, Cable Television: How Much Regulation Is Necessary, undated. (Mimeo.)

[12] Ibid., p. 3.

[13] Ibid., p. 6.

non-exclusive licences are issued--only one firm will serve as area for any length of time.

Webbink suggests re-bidding for franchises every five or ten years,[14] which is really little different from present CRTC practice of granting licences and renewals. The effectiveness of bidding as a substitute for rate regulation when undertaken only every five to ten years is, however, open to question. Bidding for franchises can successfully eliminate monopoly profits when undertaken frequently since, presumably, the price of the franchise will be bid up to such an extent that the price of the franchise will just equal the discounted stream of monopoly profits that would exist were the bidder to receive the franchise for free. The rate of discount would equal the competitive rate of return, since with frequent bidding the time horizon of the successful bidder (i.e., the life of the franchise) would be short enough that there is little uncertainty over revenues and costs. A franchise lasting for up to ten years, however, would carry with it a great deal of uncertainty regarding costs and revenues, and hence the rate of discount would be accordingly higher, implying that the amount paid for the franchise (say, for each year of the franchise's life) would be correspondingly lower. Infrequent bidding, then, raises the possibility of the continued existence of monopoly profits, whereas, detailed rate

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[14] Ibid., p. 8.

regulation and investment supervision could eliminate this possibility.

With regard to his point number 2, i.e., protection of consumers, Webbink states that in an effort to gain as many subscribers as possible, the system will provide top quality signals without any governmental regulations regarding signal quality.[15]

In areas in which U.S. signals are readily available off-air, there is probably little need for such regulation. However, in other centres such regulation would be desirable. If marginal analysis has any practical use, then presumably the marginal expense incurred to improve signal quality will equal the marginal increment in expected revenue, for a profit maximising cable company. In centres far from the U.S. border, where television alternatives without cable are low, the incentive of the cable operator to improve the system will probably be quite low also. Also, as distinct from the marginal conditions, the total conditions associated with profit maximisation need not give the full range of services that could be had by simple regulation.

The United States experience provides a useful insight into the success of giving cable companies free control over rates. In the U.S., many cable operators depreciated their systems rapidly over 5 years or so, thus avoiding all income taxes, and then sold the systems at large capital gains to

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[15] Ibid., p. 12.



new operators who raised the rates charged subscribers and began the depreciation cycle all over again. With each transfer of the franchise, rates went up.[16]

The third straw man set up by Webbink is that programme suppliers may need protection. Cable systems may charge unfair rates or refuse access altogether to some groups wishing to lease a channel. Webbink concludes that "until more experience is gained about the kinds of rates which cable systems will charge, it might be desirable not to impose rate regulations on the cable system."[17]

In addition, he states it is not necessary to make CATV a common carrier (i.e., guaranteed access to a cable channel for all who are willing to pay the rates charged) since CATV systems generally have excess channels and a profit maximising cable operator would want to have these used as much as is possible. He continues that the government has never seen fit to turn radio or television into a common carrier in the fear that certain religious and/or political groups could not obtain access,[18] so he sees no need for such regulations for CATV.[19]

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[16] Ralph Lee Smith, "The Wired Nation," The Nation, May 18, 1970, p. 587.

[17] Webbink, op. cit., p. 19.

[18] The famous F.C.C. "fairness doctrine" of providing equal time for opposing views does, in effect, make U.S. television and radio a limited common carrier.

[19] Ibid., p. 24.

Of course radio and television cannot be treated as common carriers, since the capacity of the system is limited and it cannot handle all the traffic that would result were universal access required. Certain groups will never be able to afford the high rates charged for time when demand is so great and supply is fixed due to spectrum scarcity.

The very fact that there is excess capacity on some cable systems would imply that common carrier status should be given to CATV. Without the price system acting as a barrier against access to some groups, such groups may be prohibited access by the personal prejudices of the operator. More importantly, however, the reader is reminded that it is a basic principle of monopoly theory that, within certain limits, a diminution of supply will increase profits, at least in cases in which price discrimination has been ruled out. A CATV system with great capacity would probably result in idle channels because of the cable operator's monopoly pricing, while a low capacity system could be fully utilised but the cable operator might not be induced to expand the system's capacity, again because of monopoly pricing.

The next rationale for regulating CATV listed by Webbink is the protection of competing suppliers of entertainment. This is, of course, the rationale taken in both the United States and Canada for regulating cable. Webbink's dictum is that bankruptcy is the voice of the market

place and nothing should be done to stop it.[20] Since the fourth chapter is concerned with this point, discussion of it is not treated here.

The final reason given by Webbink as being sometimes proffered for regulating CATV is that non-subscribers require some protection if television stations are forced off the air by cable; residents of rural areas and low income persons may be deprived of television. To this he states:

> The question to be asked is, at what cost to society do we protect stations from bankruptcy? Suppose that stopping the growth of cable TV in New York City keeps 100,000 persons from losing access to 2 over-the-air stations by stopping 1,000,000 people from having a choice of 20 stations instead of 9. Is it worth it?
>
> . . . in the opinion of this author it is not worth it. . . . If viewers should be protected then either (a) the government should give them a subsidy so they can buy the cable service, or (b) the government should pay the cable to provide them with connections. A far worse alternative is for the government to require the cable to provide them with free service and absorb the loss. However, the worst possible choice would be to not let the cable serve some people in order to help others.[21]

The question, even in strictly welfare economics terms, is much more complicated than Webbink admits. Without going into an extensive analysis, the following should highlight the main concerns of an economist in dealing with this question:

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[20] Ibid., p. 24.

[21] Ibid., pp. 25-26.

(1) the government should subsidise cable to such disadvantaged persons only if (and not even necessarily if) the cost of so doing will be less than the increment in social welfare therein resulting.

(2) the costs are known to be very high--see the discussion in Chapter II. Were such persons deprived of television completely, the benefits of restoring television would probably also be very high.

(3) the key question that must be answered is, then, is the increment in social welfare, enjoyed by 1,000,000 New York City residents by receiving twenty instead of nine channels greater than the loss in welfare suffered by 100,000 residents deprived of television, and what is the likelihood that cable will in time lead to a decline in the number of channels available to NYC residents?

In the first place, this requires an estimation of the value of marginal channels to viewers that gain through cable[22] and an estimate of the value of television to those who will lose by cable. One would suppose the value of channels 10 through 20 to be much lower than channels 1 to 3. And it should be remembered that those in rural areas, i.e., those likely to lose because of cable, are relatively disadvantaged with regard to other forms of entertainment and

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[22] See John McGowan and Merton Peck, "Estimating Consumer's Valuation of Additional Television Programming From CATV Data," undated. (Mimeo.)

may very well value television more highly than those in urban areas.

Having made the comparison of the benefits and costs according to the gains and losses, and for the sake of argument assuming the city dweller wins out (benefits of cable exceed the costs) it is still none-too-clear that the city dweller should receive full benefits from cable. Assuming that it remains government policy to ensure that all citizens have access to television, what the authorities must then decide is whether the cheapest way to subsidise rural residents (in view of their relative disadvantage in being able to partake in organised entertainment) is to build a cable plant to serve all rural areas or to reduce the welfare of the city dwellers by restricting their channel choice. The cheapest form of subsidy may well be the latter.

However, the above analysis has assumed a constancy in the benefits received by cable subscribers. There is a good deal of likelihood that through time their television service will also decline. This is, of course, a very relevant point for Canada, in which cable threatens to flood the country with foreign signals and make all Canadian television unprofitable. An increase in the number of television signals now may very well lead to a decline in the number of alternatives, even for cable viewers, later on.

One further point is worth elaboration. It would appear to be in the interest of the cable operator to make all local television stations unprofitable. By making unavailable to local residents any television off-air, he will have entrenched his monopoly power. It is obviously not in the interest of the cable industry to cause the decline of over-the-air broadcasting, since this is their source of product, but each cable operator, going about his business independently maximising profits, may find it to be in his interest to bring in as many distant signals as possible in an attempt to knock his local competition off the air. It could be in the interest of Canadian CATV operators to destroy the Canadian broadcasting system. Regulators must also take into account these future costs when determining the amount of freedom CATV companies should be given. An analysis of the actual threat posed by CATV is given in Chapter IV.

Shafer,[23] makes two further points that deserve some comment:

(1) CATV is not widely accepted and has many substitutes (e.g., off-air television) and can hardly be considered a necessity or monopoly.

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[23] Edward Shafer, "Cable Television: Is State Regulation Needed," Public Utilities Fortnightly, July 3, 1969, pp. 23-28.

(2) CATV widens choice from local monopolies, so it cannot be considered a public utility.[24]

With regard to the first point, Table A-1 shows the growth rate of CATV for the three years 1967-1969 in Canada.

Table A-1. Growth of CATV in Canada 1967-1969

	1967	1968	1969
Number of systems	314	377	400
Individual subscribers	408,853	555,275	722,767
Bulk subscriber (e.g., apartments)	107,631	154,801	201,044
Total subscribers	516,484	710,076	923,811
Potential subscribers (passed by cable)	1,225,410	1,606,552	1,699,749

Source: D.B.S. Community Antenna Television, 1969.

The number of cable subscribers in 1969 was 130% greater than the number in 1968, and the number of subscribers in 1968 was 137% greater than the number in 1967.

The 1966 census showed Canada to have 5,180,473 households up from 4,554,736 households in 1961.[25] If we can

[24] Ibid., p. 25.

[25] Dominion Bureau of Statistics, Canada Year Book 1969 (Ottawa: Queen's Printer, 1969), p. 183.

project 5,400,000 households in Canada in 1969, about 17% of all households subscribed to cable in that year. The growth rate is over 30%.

As cable continues to grow (unhampered) the number of substitutes (off-air signals) will begin to decline and the importance of CATV will grow.

With regard to Shafer's second point, CATV may be viewed as replacing one form of monopoly (that of the local television station) with another (itself), rather than doing away with monopoly.

APPENDIX B

THE REVENUE SIDE

(Appendix to Chapter II)

APPENDIX B

THE REVENUE SIDE
(Appendix to Chapter II)

The key variable in projecting earnings for established or about to be established CATV systems is the future growth in subscribers, which will depend upon the number of houses passed by cable and the market penetration of the system. The former will involve the number of new housing starts in the area, and this must be estimated for several years. The latter, market penetration, will depend in the first instance on the superior channel clarity and variety on CATV relative to off-air reception, and in the second instance on a host of demographic variables which have never fully been explored (such as income, the amount of "night-life" available in the municipality, public relations of the cable operator, etc.).

While financial analysts are fairly confident in being able to project costs for some time into the future, projections on potential subscribers (houses passed) and percentage saturations are less reliable. In Table B-1 can be seen a typical forecast for a CATV company up to 1979.

Table B-1. Projections For A CATV System (1969-1979)
($'000)

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
SYSTEM PENETRATION:											
Households passed	16,000	16,500	17,000	17,500	18,000	18,500	19,000	19,500	20,000	20,500	21,000
Subscribers (end of year)	11,500	12,375	13,600	14,000	14,400	14,800	15,200	15,600	16,000	16,400	16,800
Percent saturation	72.0%	75.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
OPERATING CASH FLOW	$484	$537	$584	$621	$639	$657	$675	$693	$711	$729	$747
REVENUE											
Less--											
Direct operating costs	93	121	131	142	146	150	154	158	162	166	170
Administrative expenses	66	72	79	85	87	89	91	93	95	97	99
Selling costs	13	9	12	6	6	6	6	6	6	6	6
OPERATING PROFIT BEFORE HEAD-OFFICE EXPENSES	$312	$335	$362	$388	$400	$412	$424	$436	$448	$460	$472
CAPITAL EXPENDITURES	$155	118	85	35	35	35	35	35	35	35	35
ANALYSIS:											
Revenue	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Less--											
Direct operating costs	19.2	22.5	22.4	22.9	22.8	22.8	22.8	22.8	22.8	22.8	22.8
Administrative expenses	13.6	13.5	13.5	13.6	13.6	13.5	13.5	13.4	13.3	13.3	13.2
Selling costs	2.7	1.6	2.3	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8
OPERATING PROFIT MARGIN	64.5%	62.4%	61.8%	62.6%	62.6%	62.8%	62.8%	62.9%	63.1%	63.1%	63.2%
Subscribers, average/yr.	10,743	11,937	12,987	13,800	14,200	14,600	15,000	15,400	15,800	16,200	16,600
Revenue per subscriber	$45.05	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00
Revenue per subscriber per month	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
Monthly rate	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50

Pertinent data: System in existence before 1955; 2 channels available off-air; 10 channels delivered by system.

Source: Confidential.

In the United States, cable systems have sold at very high price-earnings ratios, as Table B-2 demonstrates.

Table B-2. Value of Selected U.S. CATV Systems

U.S. Company	Estimated earnings price ratio--1969[1]	Price (Dec. 8, 1969)	Price-earnings multiple
Teleprompter	$0.75	$98	130.7X
H & B American	0.25	25 1/8	100.5X
Am. Television and Communications	0.25	17 1/2	70.0X
Cox Cable Communications	0.35	20 3/4	59.3X

[1]United Bureau Service, September 1969 - Boston.

One financial analyst compared the market valuation of the U.S. companies on a per subscriber basis at the time of the public issue of the securities; the results are presented in Table B-3.

Table B-3. Market Value Per Subscriber For Selected U.S. CATV Systems--time of public offering

U.S. Company	Value per subscriber
Cox Cable Communications	$434
Cypres Communications	426
American Television and Communications	421
Television Communications	395

Source: Confidential.

Valuing a cable system by the number of subscribers, as is often reported in the popular press, is rather naïve, as the following analysis will show. Table B-4 presents alternative methods of evaluating six Canadian CATVs as developed by a financial analyst. Comments on these alternate methods follow.

The 20X earnings method was chosen as one alternative because, at the time, the price/earnings multiple of broadcasting stocks listed on the Toronto Stock Exchange were slightly over this amount.

Speaking generally, 80% of the assets for many CATV companies are leased from the telephone companies and others, and so interest is often focused on cash flow (i.e., total revenue less expenses before depreciation). Such cash generation is substantially in excess of requirements for capital expenditures and working capital, and so evaluating a system on this basis may be valid. The discount factor of 15% reflects the anticipated risk and cost of capital for CATV systems, and the time value of money.

Two methods of employing cash flow were used. The first simply takes cash flow for a given year and multiplies it by 20 (i.e., 20 years) and then employs the discount factor. The more sophisticated method estimates the cash flow stream into perpetuity. The first four years of cash flow estimates were based on company forecasts, the next six years' estimates were based on the saturation level of

Table B-4. Alternate Valuations of CATV Systems
($'000)

System	20X earnings	20X cash flow for a year discounted at 15%	Earnings stream discounted at 12%	Potential cash flow discounted at 15%	$200 per subscriber	Final figure used
α	7,550	3,618	5,188	4,231	6,073	6,500
β	776	959	1,590	1,365	765	1,500
γ	3,374	1,743	1,826	1,870	3.205	3,000
∂	2,990	2,137	3,235	3,964	4,198	3,500
ε	509	368	483	535	459	100
ρ	248	428	330	442	724	400

Source: Confidential.

the system obtained (by forecast) at the beginning of the six year period and projected on the basis of the potential saturation of the system. The remaining years into perpetuity were based on an anticipated household growth of 2% in the licensed area.

The projections on the earnings stream in perpetuity were based on the same methods as described above in projecting cash flow. The 12% discount factor was chosen due to the fact that between 1946 and 1965 the annual return to investors for all U.S. common stocks in terms of capital appreciation and dividends re-invested was 12%; it was assumed, therefore, that investors expect a minimum return of 12% from common equities.

The method of evaluating a system by simply pricing it at $200 per subscriber was chosen mostly as a reference or supplement to the other methods. The actual subscribers method is unable to differentiate between old systems (which would generally be closer to their potential saturation) and new systems (which will have a much greater potential in attracting new subscribers).

There are two points worth emphasising as evidenced by Table B-4.

First, there is a large variance in the value placed on a CATV system when these alternate methods are used, some methods often pricing the system at over twice the value obtained by other methods.

Second, there is no consistency in methods used as to the ordinal ranking of values placed on systems. Whereas 20X earnings gives the highest price for system α of all methods, it gives the second lowest price for system β out of five prices.

Discounting the earnings stream at 12% nearly always gives a larger value to a system than does the 20X cash flow for the given year method, as the former makes allowance for potential growth to the system while the latter does not. For similar reasons, the discounted potential cash flow method also gives a higher value than the 20X cash flow method. The prices arrived at by employing the two discounted earnings streams methods are generally fairly close, but there is no consistent pattern as to which gives the higher value. The 20X earnings and 20X cash flow methods show wide divergences between the prices derived (in some cases, one method giving values over twice that of the other) and there is no pattern as to which method will give the higher value from system to system.

Between the limits set out in Table B-4, there is a wide latitude for bargaining, and the price arrived at will generally depend upon the forces of demand and supply for cable systems. For instance, in selling cable systems in order to comply with the governmental order requiring

Canadian ownership of broadcasting undertakings,[1] one would expect prices to approach the lower limit, since owners of such broadcast undertakings face the possibility of having their licences lifted within a specified period of time.

The CRTC also exerts its influence on the prices of CATV (and other broadcast) undertakings in other ways. The Commission states it "will not entertain applications for changes in the conditions of CATV licences as regards customer charges solely to adjust to a capital valuation or terms of payment arrived at in the bargaining between the seller and buyer."[2]

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[1]Governor-in-Council. PC 1969-630, SOR 69/140, March 27, 1969, and Canadian Radio-Television Commission decision CRTC 70-222, August 26, 1970. The Order-in-Council stated that after September 31, 1970 broadcasting licences may not be issued, amended or renewed to persons who are not Canadian citizens or eligible Canadian corporations, an "eligible Canadian corporation" being defined as one in which at least 80% of the issued shares are owned by Canadian citizens or in which 80% of the issued shares are owned by corporations in which 80% of the directors are Canadians and in which Canadians own at least 80% of the stock. In the CRTC Public Announcement, the dealine for the expiration of the licences of non-qualifying broadcasters was extended to December 31, 1971.

[2]CRTC Public Announcement, July 10, 1969.

Similarly, the Commission has retained tight control over who purchases licences in order to keep control of cross-media ownership and concentration of the media.[3]

By forcing sales, restricting eligible buyers, and holding down rates the CRTC has probably caused the sale

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[3]Loc. cit. The Commission further states "it is, however, the policy of the Commission to scrutinize applications for the transfer of assets of licensees or for transfer of control of licensees in a manner comparable to its examination of applications for licences for new undertakings."

The following decisions reflect various aspects of the CRTC's ownership policy:

(1) Local control of broadcast undertakings: CRTC 70-96.
(2) Prohibition of banking interests in broadcasting to limit concentration: CRTC 69-320.
(3) Prohibition of common carrier's ownership of CATV: CRTC Public Announcement Dec. 3, 1969.
(4) Concentration: CRTC 69-253; 70-41; 70-145; 70-175; 70-167; 70-156; 70-157.
(5) Prohibition of public utilities' ownership: CRTC 70-144.
(6) Prohibition of an effort to "traffic" in licences: CRTC 69-259, 69-261; and raise rates CRTC 70-199.

The Senate Committee on the Mass Media felt that the principal factors influencing CRTC licensing policies were a sense of community participation, the degree to which the applicant controlled other media holdings and his other commercial holdings, but that "economic and financial considerations outweighed those [other factors]." Mass Media, Vol. II, op. cit., p. 33. Another observer described CRTC licensing policy in this way: ". . . the CRTC also appears to prefer the continuation of tight voting control in the hands of individuals who own and preferably manage the broadcasting enterprise. At the same time, general approval appears to have been given to the idea that there should be substantial "grass roots" involvement in the ownership of broadcasting companies. The combination of these requirements places undue restrictions on the proper financial management of public broadcasting companies. . . ." See Pitfield, Mackay, Ross and Company, The Canadian Broadcasting Industry, Toronto, 1970, p. 65.

prices of CATV systems to be closer to the lower bound than would otherwise be the case. It will be noted that whereas the Canadian systems were valued at $200 per subscriber in Table B-4, the U.S. systems in Table B-3 were priced at twice that amount. The reader is also referred to our previous discussion (page 405) in which it was pointed out that in the United States where the FCC is generally quite lax in regard to the sale of licences, the CATV industry had shown a history of such "trafficking" in licences.[4]

In Table B-5 is presented DBS's revenue and cost summary of the Canadian CATV industry for 1969 by revenue groups.

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[4] "The effect of FCC determinations in individual cases in restricting concentrations of control of mass media has been virtually nil. . . . The only effective limitations on concentrations of ownership are those embodied in specific regulations. . . . With opportunities for relatively free transfers of licenses, no dramatic gains were achieved in promoting local ownership, integration of ownership and management, or diversification of the media of mass communications." William K. Jones, Regulation of Cable Television by the State of New York, Report to the Public Service Commission of the State of New York, 1970, pp. 25 and 36.

"Only the FCC is directly empowered to keep media ownership patterns compatible with a democracy's need for diversified sources of opinion and information . . . [but the FCC] has lost much of its zeal for combatting concentration." Nicholas Johnson, How to Talk Back to Your Television Set (New York: Bantham, 1970), pp. 61-62. The FCC policy regarding ownership is doubly ineffective since generally licences are renewed automatically upon expiration, regardless of performance, in addition to the relative absence of regulatory controls over licence sales.

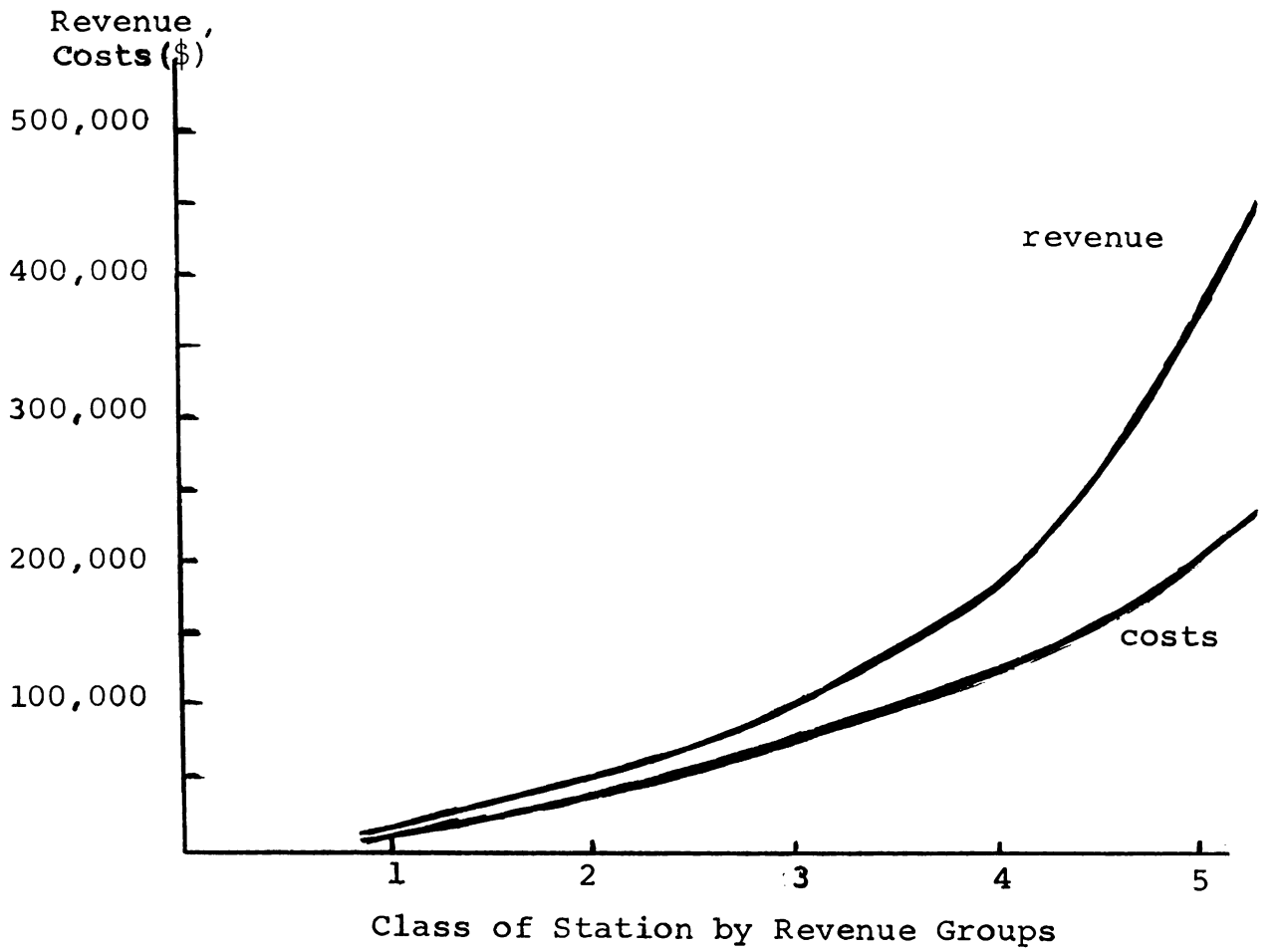
Table B-5. Operating Revenue and Expenses of the CATV Industry by Revenue Groups, 1969

	225 stations under $50,000	56 stations $50,000-99,999	40 stations $100,000-199,999	34 stations $200,000-399,999	45 stations $400,000 and over	Total (400 stations)
OPERATING REVENUE:						
Installation charges	$ 371,076	$ 278,952	$ 311,102	$ 748,801	$ 1,160,272	$ 2,870,203
Monthly service charges	2,079,440	2,833,354	4,044,117	5,972,220	18,511,152	33,440,283
Other operating revenue	181,019	157,283	387,942	91,511	251,668	1,069,423
Total Operating Revenue	2,631,535	3,269,589	4,743,161	6,812,532	19,923,092	37,379,909
OPERATING EXPENSES:						
Interest	232,923	226,746	361,572	670,861	935,693	2,427,795
Depreciation	450,288	576,245	846,274	1,251,373	3,479,162	6,603,342
Rental of land, bldgs., equipment	174,698	283,968	397,421	427,851	1,003,220	2,287,158
Repairs and maintenance	383,580	190,062	263,146	439,159	991,002	2,266,949
Electricity	55,156	43,951	114,320	56,177	130,884	400,488
Salaries, wages, bonuses	820,351	799,534	1,264,104	2,272,887	3,961,774	9,118,650
Staff benefits	13,808	23,845	42,454	101,831	168,514	350,452
Professional services	179,169	258,557	307,602	226,659	1,068,338	2,040,325
Advertising, promo., travel	156,194	88,083	156,569	322,698	1,031,252	1,754,796
Taxes (exclud. income tax) and licences	42,907	32,284	57,561	65,191	260,882	458,825
Office supplies, expenses	63,908	84,526	164,432	302,336	626,525	1,241,727
Bad debts, doubtful accts.	17,212	14,220	18,398	27,299	150,645	227,774
Other operating expenses	337,015	402,746	493,281	286,384	580,710	2,100,136
Total Operating Costs	2,927,209	3,024,767	4,487,134	6,450,706	14,388,601	31,278,417
NET OPERATING REVENUE (EXPENSES)	295,674	244,822	256,027	361,826	5,534,491	6,101,492

Source: Dominion Bureau of Statistics, Community Antenna Television--Services de Télévision à Antènne Collective (Ottawa: Queen's Printer, 1970), p. 12.

The CATV industry in Canada collected over $37 million in 1969, and obtained a pre-corporate income tax profit of over $6 million. If one removes depreciation and interest charges as was done in Chapter II with the sample of CATV systems, one can plot meaningful cost-revenue relationships for "average" systems in each revenue class, as is done in Figure B-1, which is based on Table B-6.

Figure B-1. Relation Between Revenues and Costs for CATV Systems by Revenue Class.



Source: Table B-6.

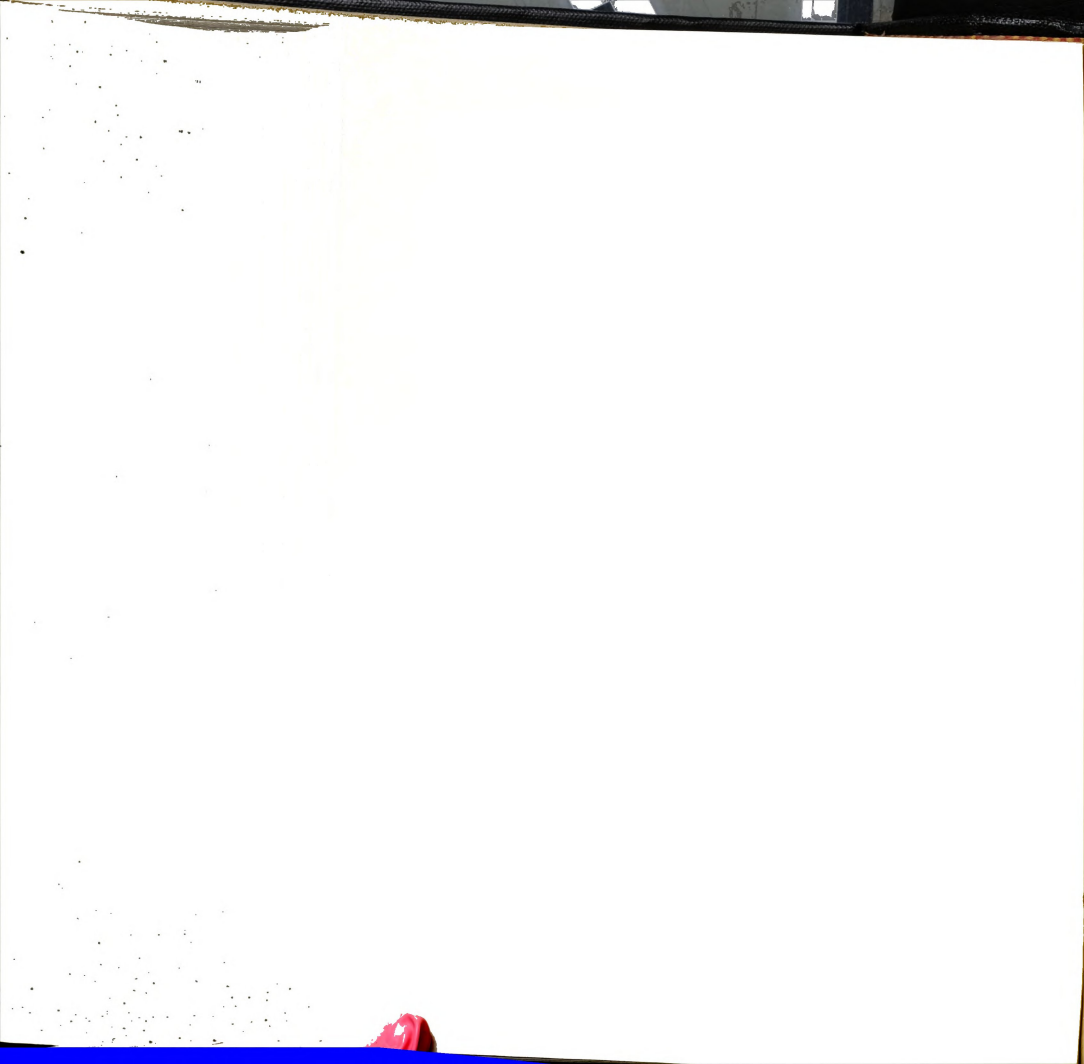
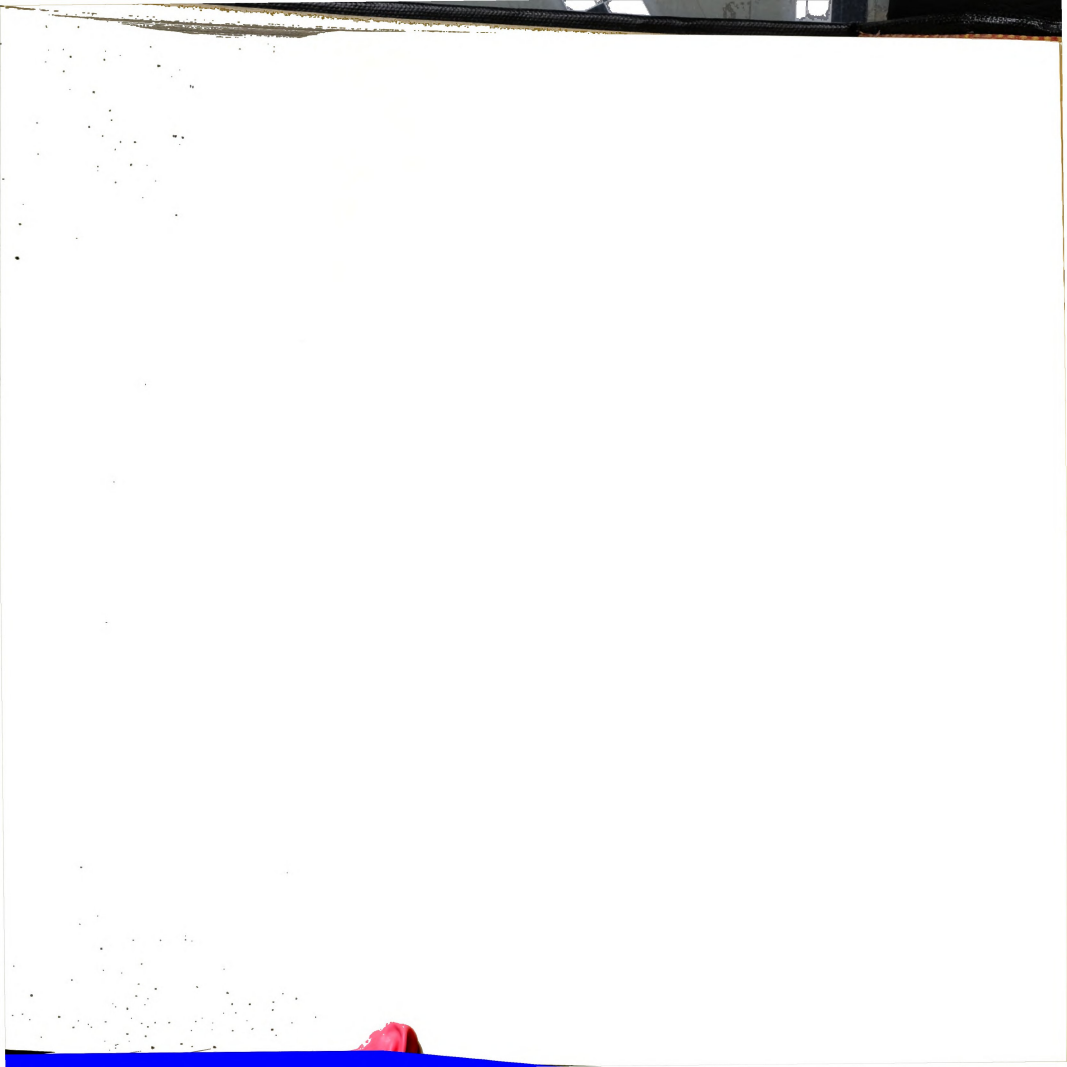


Table B-6. Operating Revenue and Expenses per CATV System for Systems of Various Revenue Groupings, 1969

	System size				
	Under $50,000 Class 1	$50,000 to 99,999 Class 2	$100,000 to 199,999 Class 3	$200,000 to 399,999 Class 4	$400,000 and over Class 5
Average revenue per system	$11,696	$58,385	$118,579	$200,370	$442,735
Average operating costs per system (pre-income tax, excluding depreciation and interest)	9,973	39,675	81,982	133,190	221,639

Source: Table B-5.



By definition, the revenue curve rises in Figure B-1 as one proceeds from class to class. No significance should be attached to the rate at which it rises, since this depends upon the arbitrary spacing of the five classes on the X-axis.

The average cost curve rises also, but at a lesser rate than the revenue curve, indicating that the larger systems tend to be the most profitable. Were I to allocate depreciation expenses, I would expect this trend to be lessened, but not reversed.

APPENDIX C

COAXIAL CABLE DISTRIBUTION SYSTEM

AGREEMENT BETWEEN THE MANITOBA TELEPHONE SYSTEM AND METRO VIDEON (Edited)

(Appendix to Chapter III)

COAXIAL CABLE DISTRIBUTION SYSTEM AGREEMENT

THIS AGREEMENT made in duplicate the 31 day

of May in the year of our Lord one thousand nine hundred and sixty-

seven.

BETWEEN:

THE MANITOBA TELEPHONE SYSTEM
(hereinafter called the "Telephone System");

OF THE FIRST PART:

- and -

METRO VIDEON LIMITED.
(hereinafter called the "Customer).

OF THE SECOND PART.

WHEREAS the Customer, being in possession of all licenses required by law has requested the Telephone System to furnish cable facilities in the area described in Article #2 of this Agreement in the Metropolitan Winnipeg area in the Province of Manitoba, as required by the Customer initially and from time to time, as hereinafter described, for use by the Customer in conjunction with the Customer's own facilities and equipment for the distribution to the Customer's patrons of off-the-air television and radio programs, but excluding industrial, commercial, educational and other similar television service offerings which may normally be distributed on a limited network or point-to-point basis, and the Telephone System has agreed to furnish, install, establish, repair and maintain the said cable facilities for the use of the Customer subject to and upon the terms and conditions hereinafter set forth and contained in this agreement and its exhibits.

ARTICLE #3
CABLE FACILITIES TO BE PROVIDED BY THE TELEPHONE SYSTEM AND THEIR USE BY THE CUSTOMER

The Telephone System shall, for and during the term of this agreement, as hereinafter provided, but subject always to the provisions herein contained, furnish, install, establish, repair and maintain, but only as from time to time indicated on Exhibit No. "1", all cable facilities consisting of trunk, feeder, and distribution cables, coaxial cable connectors, flexible cable assemblies, any equipment housing in which the cable terminates, cable distribution networks and all lashing wire, suspension strand and associated pole line hardware(all of which trunk, feeder and/or distribution cables, coaxial cable connectors, flexible cable assemblies, any equipment housing in which the cable terminates, pedestal terminals, cable distribution networks, lashing wire, suspension strand and associated pole line hardware are in this agreement referred to as "cable facilities"), as may be initially required, and applied for by the Customer from time to time during the continuance of this agreement, for the use by the Customer, in conjunction with its own facilities and equipment for the purpose of distributing, from the output side of the Customer's master television antenna and/or studio or studios to the end of the cable facilities furnished, installed and established by the Telephone System in accordance with this

agreement and as indicated on Exhibit No. "1" attached hereto, broadcast television program material or frequency modulation radio program material, broadcast openly for free public reception from a licensed broadcast television or radio station received directly off-the-air or indirectly by microwave relay(where permitted by the Department of Transport and the Board of Broadcast Governors) by the Customer's equipment, or injected in to the distribution system by direct connection(where permitted by the Department of Transport and the Board of Broadcast Governors) from standard television or radio broadcast stations, to standard television or radio receiving sets of all the customers patrons. The Customer may not authorize any other persons to use this service. Coding of signals or segregation of channels, or programming material being transmitted to patrons of the Customer by any means that would not allow all of the Customers patrons to receive all of the material being transmitted with standard television or radio receivers is not permitted. Additional channels may not be created from channels provided to the Customer for use of the CATV system.

Notwithstanding anything contained in this Agreement, the Customer may use one of the cable television channels allocated to it by this agreement for the purpose of providing additional program services of an entertainment or informational character such as sporting events, special films, weather service, and time service, provided that such programs are available to all the Customers patrons and that no extra charge is made therefor and provided that the use of cable television channels for such purposes is not prohibited by the Department of the Government of Canada or any agency, board, commission or other body authorized by the Government of Canada to deal with such matters.

ARTICLE 4

A. OWNERSHIP OF CABLE FACILITIES

Upon the completion of the supply and installation of the cable facilities in any one of the areas shown in Schedule "A" hereto or any areas added thereto from time to time,or any part of any such area,the Telephone System shall become and remain the absolute owner of all the said cable facilities furnished by it hereunder and shall become and remain the absolute owner of any additional cable facilities furnished by it hereunder as requested from time to time by the Customer for the Customer's use under this Agreement.

The Customer shall have the right for the purposes set out in this Agreement to make use of the following channels or space in the frequency spectrum contained in the cable facilities furnished by the Telephone System under this contract;

(a) VHF channels contained in the 54-88 megahertz wave band for television channels 2 - 6 inclusive.

(b) VHF radio channels from 88-108 megahertz for broadcasting FM radio programs.

(c) VHF channels contained in the 174-216 megahertz wave band for television channels 7 - 13 inclusive.

The Telephone System shall have the right to use the remaining channels or spaces in the frequency spectrum in the said cable as well as UHF channels 14-83 inclusive over the frequency range of 470-890 megahertz inclusive, and for that purpose enter the said cable, provided however that the Telephone System will not use or allow any other person to use any of the said channels reserved to itself for the purposes of competing with the entertainment channels to be used by the Customer.

The Telephone System may from time to time permit the use of any of the channels so reserved to it by this Article by the Customer, on such terms as may be agreed on between the two parties.

It is mutually agreed between the parties hereto that the use of the channels in the said frequency spectrum in the said cable hereby allocated to the Customer shall be used for entertainment purposes only unless the Telephone System, in writing, grants to the Customer, permission to use the said channels for any other purposes and, without restricting the generality of the foregoing, the Customer shall not use its part of the cable facilities for industrial, commercial or educational television or other similar television service offerings which may usually be distributed on a limited network or point to point basis.

B. THE TELEPHONE SYSTEM MAY MAKE SIMILAR AGREEMENTS.

Notwithstanding anything contained in this Agreement the Telephone System shall have the right and shall be free to enter into similar agreements with other persons, firms or corporations for the same objects and purposes and on the same terms as herein contained, in the territory or in part of the territory, covered by this Agreement as shown in Schedule "A" hereto or any addition to the territory shown in such Schedule.

C. TYPE OF CABLE

The Customer shall have the right to set out the specifications for the cable which the Telephone System will furnish and provide pursuant to this agreement, subject to the said cable meeting the minimum specifications set out in Exhibit #3 of this Agreement.

The System may at its option, submit said specifications to any or all possible suppliers for competitive bids, according to the System's purchasing policies in affect at the time, and it is expressly understood, covenanted and agreed that in providing and furnishing cable pursuant to this agreement in accordance

with the customer's requirements, the Telephone System does not accept any responsibility whatsoever for, nor does it warrant, the satisfactory performance of, or transmission over, the overall transmission facilities, except as provided for in the Plan or Plans of Exhibit #1.

D. EMERGENCY WORK

If at any time and from time to time during the continuance of this Agreement it should become necessary, in the opinion of the Telephone System, for the protection of persons or property, for the Telephone System to perform emergency repair and maintenance on any portion of the cable facilities provided by the Telephone System or on any facilities and equipment provided by the Customer pursuant to this Agreement, the Telephone System will have the right to recover the cost of any such repair and maintenance from the Customer such cost to be charged on the same basis provided for repair and maintenance on a call-out basis. The Telephone System shall, in advance if possible, or as soon as possible thereafter notify the Customer, of such emergency repair and maintenance work.

ARTICLE 5

A. FACILITIES AND EQUIPMENT PROVIDED BY CUSTOMER

Article 3 stipulates the cable facilities that are to be provided by the Telephone System. Any and all other facilities and equipment whatsoever, including amplifiers, which may be required to operate the Customer's CC distribution system and/or to furnish its service to its subscribers shall be

furnished, installed, established and maintained by the Customer at its own cost and expense.

The design of all facilities and equipment, including amplifiers supplied by the Customer shall be submitted to the Telephone System for approval and none of the Customer's facilities and/or equipment, including amplifiers shall be installed unless or until the design is approved by the Telephone System.

It is mutually agreed between the parties hereto that should the Telephone System, at any time during the subsistence of this Agreement, desire to change the type of amplifiers installed from time to time by the Customer, the Telephone System shall be at liberty to change any or all of such amplifiers to a type designated by the Telephone System, the said change to be made at the expense of the Telephone System, with as little interference to the operation of the Customer's facilities as is reasonably possible; provided, however, that any replacement amplifiers installed by the Telephone System shall not interfere with the use of any of the Customer's channels or reduce the efficiency of the signals of the Customer to its subscribers.

It is further mutually understood and agreed between the parties hereto that should the Telephone System exercise its rights under this Agreement to change any or all of the amplifiers, the amplifiers substituted by the Telephone System shall be and become the property of the Telephone System and the displaced amplifiers shall be returned to the Customer.

In the event of the substitution of amplifiers by the Telephone System as herein provided, then all such amplifiers shall be serviced and maintained by the Telephone System and not by the Customer and the saving in cost to the Customer shall be assessed by the Telephone System and that saving in cost shall be paid annually by

Customer to the Telephone System when invoiced as a separate item, or the net saving may be reflected in the periodic rate variations, at the option of the Telephone System.

B. OPERATION OF CABLE FACILITIES

It is expressly understood, covenanted and agreed between the parties hereto that the Telephone System's undertaking under this agreement is only to furnish, install, establish, repair and maintain the said cable facilities, as aforesaid, as required and applied for initially and from time to time by the Customer; that the Telephone System does not by these presents undertake or agree to operate the said cable facilities for the Customer; that the operation of all the aforesaid cable facilities so furnished hereunder by the Telephone System will rest solely and entirely upon the Customer at all times; and that all repair and maintenance of said cable facilities shall be performed solely by the Telephone System on a call-out basis and the cost shall be borne by the Customer as provided for in Exhibit No. "5".

In case of emergency the Customer may perform, at its own cost, minor repair work. In such case, the Customer shall notify the Telephone System, in advance whenever possible, before such work is carried out, or as soon as possible thereafter. Any further repair work which may be deemed necessary by the Telephone System after the Customer has completed such emergency repair work shall be performed by the Telephone System, but the cost of such work shall be borne by the Customer. The provisions of Exhibit "4" to this agreement shall in all respect, be subject to this paragraph and the preceding paragraph.

Should the Customer carry out emergency repair work provided in the first sentence of the preceding paragraph, and any damage be done to the Telephone



System's telephone facilities, the Customer will completely indemnify the Telephone System against any loss, costs, damage or expense which the Telephone System may incur as a result thereof.

C. PAYMENTS

The Customer shall pay to the Telephone System in accordance with Exhibit #5 to this Agreement all the Telephone System's non-recurring construction charges as defined in said Exhibit #5 and Article #1 of this Agreement and shall, in addition, pay the monthly rentals, repair, maintenance and inspection charges all as provided for in this Agreement including the Exhibits attached hereto.

D. CUSTOMER'S CHARGES TO ITS PATRONS

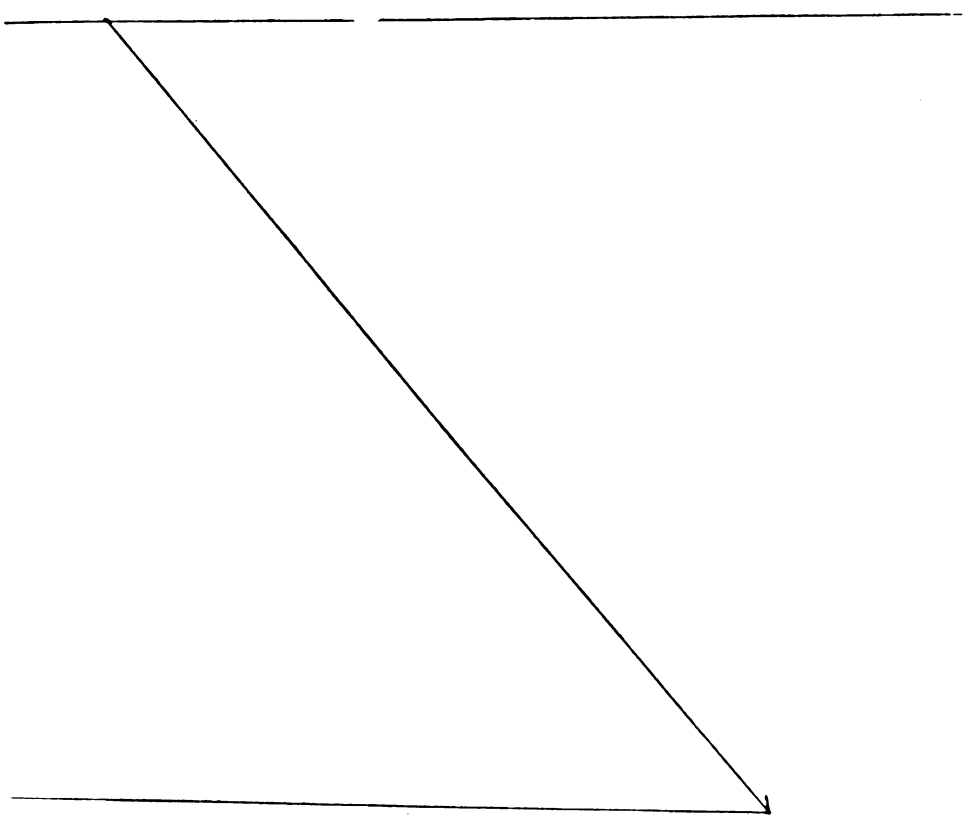
It is mutually understood and agreed between the parties hereto that the Customer's charges to its patrons will not exceed the following amounts:

(a) installation charge for the initial outlet	$10.00
(b) monthly rental charge for the initial outlet	$ 5.00

nor shall the Customer charge to any such patron for any extra outlet supplied to him over and above the initial outlet supplied to him, more than $2.50 per month rental nor more than $5.00 installation charge without permission in writing of the Telephone System.

E. Subject as herein provided, the Customer covenants and agrees to supply to its patrons, services from all the local television and FM radio stations described in its license and, in addition, service from American stations shown in its license so as to supply NBC, CBS and ABC networks to its patrons. It is further agreed that should the Customer, because of technical difficulties or because there is no American station

close enough to Winnipeg so that the Customer can pick up a reasonable signal to provide any one or more of the NBC, CBS or ABC network service to its patrons, it will, in place of the service from any of these networks which it is unable to provide, if some other American network or networks are available to it, apply for a change in its license to permit it to, and will, upon receiving the amendment, provide the service of that network or networks.



(13a)

ARTICLE 6

A. CONNECTION TO TELEPHONE SYSTEM FACILITIES

The physical connections between the said cable facilities furnished by the Telephone System, as aforesaid, and the Customer's own facilities associated with its master television antenna and/or studio or studios shall be made at the output side of the master television antenna where the Customer's said facilities terminate, said master television antenna being located at whatever location may be authorized from time to time by the responsible authority of the Government of Canada and at such studio or studios as may be required by the Customer from time to time and at Customer-owned service drops, and amplifiers. The Customer shall not connect physically or electrically to the C.C. distribution system covered by this agreement any cable or conductor (except those used for service drops and those used for power supply to powered equipment) not provided by the Telephone System.

A1. INTERCONNECTION WITH TELEPHONE SYSTEM FACILITIES OF CUSTOMER-OWNED FACILITIES FOR MINOR CABLE EXTENSIONS.

However, notwithstanding the above, the Telephone System may of its own free will permit interconnection with Customer-installed cable facilities in those cases where the Telephone System either cannot or will not install cable facilities as requested by the Customer pursuant to this Agreement under the following terms and conditions:

(1) The Customer shall first submit a plan in duplicate to the Telephone System showing the location and lengths of the Customer's cable extension and the point at which connection would be made with the cable facilities furnished by the

Telephone System pursuant to this Agreement. Such plan shall be dated and signed by the Customer's duly authorized officer as provided for in Article 11 of this Agreement.

If the Customer's proposed plan is acceptable to the Telephone System, the Telephone System's duly authorized officer, as provided for in Article 11 of this Agreement, shall sign both copies of the plan and shall return one copy to the Customer. Such signed copy of the plan shall constitute the Telephone System's permission for the Customer to connect its cable extension to the Telephone System's cable facilities. If the Customer's connection is unacceptable to the Telephone System, both copies of the plan shall be returned unsigned to the Customer.

(2) In the case where the Customer is permitted by the Telephone System to proceed with the connection, all cables, conductors and other associated equipment shall be installed, repaired and maintained in conformity with the requirements of the Canadian Standards Association.'

(3) The Telephone System shall have the right to immediately disconnect all cables, conductors and other associated equipment installed by the Customer, where in the Telephone System's opinion, the requirements referred to in (2) above are not adhered to by the Customer.

(4) No extension whatsoever to any installation as approved in (1) above shall be made by the Customer, without the Customer having first obtained the Telephone System's approval by the submission of a plan to cover such extension.

It is expressly understood that the provisions of this Clause A1 shall apply only in respect of and as regards the interconnection of Customer-owned and installed cable facilities for minor extensions of the existing C.C.D. system under this agreement and in no event shall the interconnection privileges provided for in this clause apply to the interconnection of cable facilities furnished by the Telephone System under this agreement with any other separate C.C.D. system, whether or not Customer-owned and whether or not the cable facilities for such other separate C.C.D. system are furnished by the Telephone System under separate agreement with the Customer.

B. FREQUENCIES AND CHANNELS ALLOWED.

The Customer shall have the right, subject to the terms and conditions of this Agreement and in consideration of the service charges and rentals provided for in Exhibit No. "5", to use and operate the said cable facilities furnished hereunder by the Telephone System initially from time to time, in conjunction with the Customer's own facilities, for the distribution of television and FM radio programs on the broadcast frequencies only between 54-88 megahertz both inclusive between 88-108 megahertz both inclusive and 174-216-megahertz both inclusive as set out in, and in accordance with, Article No. 4, paragraph A of this agreement.

Any other use of the frequency spectrum will be subject to the technical feasibility of the particular cases involved and to the prior written consent of the Telephone System.

C. RESPONSIBILITY FOR PROGRAM CONTENT:

It is understood and agreed between the parties hereto that the Manitoba

Telephone System will accept no responsibility whatsoever for program or program content transmitted over the cable facilities and that the Customer will indemnify and save harmless the Telephone System from and against any responsibility therefor, including any claims with respect thereto of any kind whatsoever, the said indemnity to be part of the indemnity covered by the performance bond referred to in Article #8 hereof.

D. LIMITATION OF PROGRAM SERVICE.

Notwithstanding anything in this Agreement contained, the Customer shall not under any circumstances whatsoever, provide point-to-point and/or limited network services over the said cable facilities provided by the Telephone System. For purposes of this Agreement point-to-point is defined as the distribution of program transmissions from one location to one other location for industrial, commercial, and educational purposes, and limited network is defined as the distribution of program transmissions for industrial, commercial and educational purposes from one location and made available to less locations than the total number of locations connected to the Customer's C.C.D. System.

ARTICLE 7

TERM OF AGREEMENT

This agreement shall come into effect as, of, from and including the 8th day of May, A.D. 1967 and subject to the provisions in this Agreement contained shall continue for an initial construction period of two (2) years from said date and for a further term of ten(10) years and, unless terminated at the expiry of the said term of ten (10) years by one (1) year's prior notice in writing given by either party hereto to the other, this agreement shall continue thereafter for further periods of

five (5) years until terminated at the end of any such five (5) years period by one (1) year's prior notice in writing given by either party hereto to the other.

The Telephone System shall have the right during the continuance of this agreement to adjust monthly rentals as necessary at intervals of twenty-four(24) months commencing from the 8th day of May, A.D. 1969.

It is understood and agreed that the basis of any increase or decrease in monthly rentals by the Telephone System will be increased or decreased costs of labour, material,overhead and other increased or decreased costs referred to in this Agreement.

All the installation and maintenance work undertaken by the Telephone System during the continuance of this agreement will be performed at the System's current charge for such, which will be understood to include the proportionate share of applicable overhead and loading charges.

In the event the notice of termination is given by the Telephone System as provided for in this Article, any new offer which the Telephone System may be willing to make to, or accept from any other person, firm or corporation during the one-year termination period with regard to the cable facilities covered by the attached Exhibit No. "1", shall be first submitted in writing to the Customer for acceptance and unless the latter signifies its acceptance in writing of such offer within thirty (30) days from the date of such offer, or prior to the end of the termination period if the offer is made during the last month of such termination period, the Telephone System shall be free to enter into an agreement with any other person, firm or corporation on the same terms as contained in such offer and all rights of the Customer with respect to the cable facilities under this agreement shall thereupon terminate and be at an end.

Should the Customer terminate the agreement as herein provided, then all the rights of the Customer herein set out shall terminate at the expiration of the period of this agreement or any extension thereof and the Telephone System may deal with the said cable

facilities with any other person, firm or corporation to the exclusion of the Customer.

Should the Telephone System terminate the Agreement as herein provided without intending to have the said cable facilities used by any other person, firm or corporation then the rights of the Customer under this Agreement shall be terminated and at an end, and the Telephone System may use the said cable facilities for any purpose it may deem advisable including, without restricting the generality of the foregoing, the distribution by the Telephone System of community antenna television service if licenced to do so by the Department of Transport, the Board of Broadcast Governors or such other authority as may, at that time, be designated as the licensing authority.

ARTICLE #8.

GENERAL

1.(a) The Customer shall not assign, transfer or sublet the privileges hereby granted, or assign or transfer this agreement or any part thereof, without the prior consent in writing of the Telephone System and the Customer shall not permit, subject to sub-paragraph (b) of this Article 8, Section 1, the assignment, transfer or other disposition of any of its shares of stock or any debenture or bond, which carry voting rights, without the prior consent in writing of the Telephone System. Any breach of this provision shall be a breach of covenant under paragraph 8 hereof. It is agreed that the restriction on the assignment, transfer or other disposition of stock, debentures, or bonds referred to above shall be for the period of two years from the date of the execution of this agreement and that, with respect to the assignment, transfer or subletting of the agreement or any privilege thereunder referred to in the first three lines of this paragraph, the Telephone System will not unreasonably withhold its consent;

Notwithstanding sub-paragraph (a) above the Customer may permit the transfer (subject always to the approvals required under any laws of Canada from time to time in force) of any of the shares of the capital stock of the Company or of any debenture or bond which carry voting rights by:

(i) The Shareholders of the Customer to a public company hereafter incorporated or caused to be incorporated by Famous Players Canadian Corporation Limited, being the stockholder of the Company;

(ii) R. L. Moffat to the Moffat Broadcasting Ltd. or to any other Moffat family holding company incorporated under the laws of Canada or any province thereof;

(iii) Ralph Misener to any Corporation incorporated under the laws of Canada or any province thereof, the majority of the voting shares of which are owned by the said Ralph Misener, his wife, his children, grandchildren, or any spouse of any child or grandchild;

(iv) Claude Boucher to any Corporation incorporated under the laws of Canada or any province thereof, the majority of the voting shares of which are owned by the said Claude Boucher, his wife, his children, grandchildren, or any spouse of any child or grandchild.

2. The Customer shall furnish annually, a performance bond in a form and in a Surety Company satisfactory to the Telephone System during the subsistence of this Agreement in the amount of $250,000.00 to guarantee the payment of any sums which may become due to the Telephone System for construction charges, rentals, installation, maintenance, _____

repairs and for any other work performed by the Telephone System for the benefit of the customer under this agreement, including the removal of the facilities upon termination of this agreement under any of its provisions, and to guarantee the Customer's compliance with the provisions of Article 6C of the agreement & of Exhibit "2".

3. On the termination of this agreement under any of its provisions, the Telephone System, may, at its option, remove the cable facilities or any part thereof installed under this agreement and the cost of removal of said facilities shall be paid for by the Customer: provided that if the Telephone System informs the Customer within ninety(90) days after the termination of the ten year period that it wishes the cable facilities or any part thereof to be removed, and, should the Telephone System not so inform the Customer within the specified time, then the removal of said cable facilities, if desired thereafter, shall be carried out by the Telephone System at its own expense.
4. The Customer will promptly pay any tax, fee or charge that may be levied or assessed against the Telephone System's aerial facilities, ducts or property solely because of their use by the Csutomer. If the Customer shall fail to pay any such tax or assessment on or before such tax becomes delinquent, the Telephone System, at its option, may pay such tax on account of the Customer, in which case the Customer will promptly reimburse the Telephone System for the full amount of the tax so paid.
5. It is mutually understood and agreed between the parties hereto that the channels or spaces in the frequency spectrum of the Customer's CATV distribution network furnished hereunder as set out in paragraph A of Article #4 and not in use by the Customer may be used by the Telephone System for any of its telecommunication purposes or for any other purpose not competitive with the entertainment channels to be used by the Customer, and, without restricting the generality of the foregoing, the channels or spaces reserved to the Telephone System may be used for educational, commercial or industrial television or other similar television service offerings which may be distributed either generally or on a limited network or point-to-point basis. Subject to Article #16 hereof any TV channel allocated by this agree-

ment to the Customer which is not in use by the Customer but is used by the Telephone System hereunder shall be paid for by the Telephone System at a rate to be negotiated.

6. It is mutually understood and agreed between the parties hereto that should the Telephone System require to use any of the channels contained in its part of the spectrum in the CATV cable facilities to be supplied hereunder, and, for that, or any other purpose, require to use drop wires to provide entry into the homes or offices of its subscribers then the Telephone System shall be entitled to take over the ownership and control of any or all of the drop wires provided by the Customer and use the said drop wires for the purpose of obtaining entry into the premises serviced by such a drop wire for the service or services to be supplied by the Telephone System; provided, however, that the said drop wires shall not be used by the Telephone System for any services that are competitive with those supplied by the Customer to its patrons and shall not interfere with the supply to its patrons by the Customer of a signal of satisfactory quality for the Customer's service. Should the Telephone System exercise the right to over take the ownership and control of the said drop wires or any of them as hereinbefore set out,

(a) the maintenance of said drop wires shall be performed by the Telephone System and the expense of such maintenance shall be divided between the Telephone System and the Customer in proportion to the frequency space used in the drop wire by the Telephone System and the Customer respectively, and,

(b) The Telephone System shall pay to the Customer the capital cost of installing the said drop wire or drop wires less depreciation, based on the depreciation rate of 10% per annum.

7. It is further mutually understood and agreed between the parties hereto that should the Telephone System at any time during the duration of this

Agreement, for its communication requirements, require to change the design, layout or route of the CATV network or any part thereof covered by this Agreement, then it shall have the option of changing such design, layout or route of the CATV cables, amplifiers and other equipment so as to supply its communication requirements, such change to be made at the expense of the Telephone System; provided that if the Telephone System shall make any such change in the CATV network or any part thereof the Telephone System covenants and agrees with the Customer to effect such change in such a manner so as not to interfere with the service supplied by the Customer to its patrons and so as not to degrade the signal supplied by the Customer to its patrons.

8. Notwithstanding the term of this Agreement as provided for in Article 7 hereof, the Telephone System shall have the right at any time upon thirty (30) days' written notice to the Customer to terminate this agreement, either during or subsequent to the initial ten (10) year term upon default by the Customer in the payment of any charges or rentals payable under this Agreement or upon failure by the Customer to carry out and perform any of its covenants, undertakings, and obligations herein contained.

ARTICLE 12

It is mutually understood and agreed between the parties hereto that the right of the Telephone System to cancel this Agreement under Article #8 hereof may be exercised by the Telephone System in the event that the Customer's license from the Department of Transport or the Board of Broadcast Governors is cancelled or is not renewed, or the Customer is unable to obtain, reinstate or renew any municipal license required by law and if the Customer is unable to obtain, reinstate or have renewed the Department of Transport or the Board of Broadcast Governors license, or obtain, reinstate or have renewed any necessary municipal license, within a period of three months of being notified by the respective authority that the said license will not be issued, reinstated or renewed: provided that the Telephone System will grant such reasonable extension as may be necessary should the Customer notify the Telephone System that it intends to contest by Court action any such cancellation or refusal to reinstate or renew any license referred to herein.

It is further understood and agreed between the parties hereto that the Customer will at all times comply with the technical specifications contained in Exhibit No. 3 of this agreement, and without restricting the generality of the foregoing, it is understood and agreed that the Department of Transport radio standard specification 102 contained in said Exhibit No. 3 is hereby adopted as part of the agreement as amended by item 1.03 on page 2 of said Exhibit No. 3 and as revised in said Exhibit and Article #2 provided. Should the Customer fail to comply with Specification 102 amended by said Item 1.03 and as revised from time to time, the matter may be referred by the Telephone System to the Department of Transport and should the Customer fail to carry out any directive with respect to such specifications issued by the said Department of Transport within a time set by the said Department, then the Telephone System may terminate this agreement as provided for in paragraph 8 of Article 8 hereof.

Should the Telephone System exercise its right to terminate this agreement under the provisions of this Contract or should the Customer terminate this agreement under the provisions of Article #9 (b) then all the rights conferred on the Customer under the said agreement shall terminate and be at an end at the expiration of the period provided in the Notice of Cancellation.

ARTICLE 13

In addition to the rights conferred by Article 4B the Telephone System reserves the right at any time to itself supply CATV service, or to supply to any person, firm or corporation CATV distribution cable or channel facilities

throughout Metropolitan Winnipeg or any part thereof through its own cable distribution system, equipment, and other plant and facilities, excluding the cable facilities furnished and supplied under this agreement, and, should the Telephone System supply such CATV service and/or cable or channel facilities it shall not affect the rights reserved to the Telephone System under paragraph (A) of Article #4 paragraph 5 of Article #8 of this agreement.

ARTICLE 14

If the Customer should be adjudged bankrupt or should he make a general assignment for the benefit of his creditors or a receiver be appointed on account of his insolvency, then the Telephone System may terminate the contract as provided in paragraph 8 of Article #8 hereof.

ARTICLE 15

Where, in this agreement it is provided that the Telephone System may cancel this agreement for default by the Customer in any of its covenants or undertakings, the Telephone System shall give to the Customer thirty (30) days notice in writing of such default and the Customer will have the right to remedy such default within the said thirty (30) day period; should the Customer fail to remedy the default before the expiration of thirty (30) days from the date of the mailing of such a notice by the Telephone System, then the Agreement shall automatically be cancelled as in the Agreement provided unless the Telephone System in writing grants an extension of time within which the Customer is to remedy such default, on such terms and conditions as the Telephone System may, in the notice of extension, provide.

This clause shall not apply where, in the agreement, specific provision is made for a period of notice being given prior to cancellation or, alternatively, that no notice is required, with respect to any particular covenant or undertaking.

ARTICLE #18

This agreement and the obligations of the parties hereto hereunder may be terminated in the event

(a) that the Customer on or before the ~~eighth~~ 29th day of November, 1967 expends in the construction and testing of antennae and other head end and related equipment a minimum of $150,000.00 of new money by actual out-of-pocket expenditure and is on or before said date unable to pick up and receive a commercially marketable television signal from the American networks through the stations contained in the Customer's CATV licence, or the U.S. television stations which may be added to the Customer's licence; the Customer may in such event on or before the said ~~8th~~ 29th day of November notify the Telephone System in writing of the Customer's desire to cancel the agreement and the agreement shall thereupon

terminate and be at an end upon the payment by the Customer to the Telephone System of the monies mentioned in sub-paragraph (b) of this paragraph II, below, otherwise the agreement shall remain in full force and effect;

(b) in the event of notice of termination by the Customer to the Telephone System as in sub-paragraph (a) above set forth, the Customer shall pay to the Telephone System all costs incurred by the Telephone System or on its behalf after the date of the execution of this agreement together with the sum of $30,000.00 being reimbursement to the Telephone System for costs and expenses incurred by it prior to ~~termination~~ execution of this agreement as aforesaid; and the Telephone System shall, forthwith, upon receipt of the aforementioned monies, return to the Customer the performance bond supplied by the Customer together with the deposit certificates delivered by the Customer to the Telephone System upon the execution hereof provided that the Telephone System may at its option retain out of the said deposit certificates sufficient monies to meet the obligations of the Customer under this sub-paragraph (b);

The Customer covenants, undertakes and agrees:

(1) That the Customer will not, after the date hereof and prior to the 29th day of November, 1967 or the date of delivery of formal waiver by Customer to Telephone System of the Customer's rights under this paragraph ~~xxxxxxxxxxxxx~~ whichever shall first occur, require the Telephone System to provide or do any engineering or other work in connection with this con-

tract excepting in relation to the installation of a main or trunk cable of approximately four miles in length from the Customer's head-end facilities to that region known as Park LaSalle and

(11) the costs and expense incurred by the Telephone System after the execution of these presents and prior to the said 8th day of November, 1967, shall be deemed to include all construction costs as defined in this agreement in connection with any work requested by the Customer and agreed to be performed by the Telephone System up to receipt of notice of termination under this paragraph XXXXXXXXXXXXXX and shall for these purposes also include any liability incurred by the Telephone System under any contract or purchase agreement for material or equipment entered into by the Telephone System as a result of a request of the Customer in writing for work to be done hereunder.

(111) notwithstanding the foregoing, nothing contained in this Article shall limit or restrict the right of either party to terminate as in this agreement is otherwise provided.

OPERATING PROCEDURES

1. ESTABLISHING SERVICE

The Customer shall be responsible for the overall plan, transmission design and physical layout of the cable facilities required by it for the purpose of the distribution of off the air television and radio programs and other local sources of program materials initially and from time to time during the continuance of this Agreement. The Customer shall furnish the Telephone System with all necessary details in writing, of the cable facilities which the Customer initially requires the Telephone System to furnish, install, repair and maintain, as well as the proposed location of the Customer's own amplifiers, types of amplifiers and other equipment to be connected to such cable facilities; provided, however, that the physical layout of the Telephone System's trunk, feeder and/or distribution cables and of the Customer's own amplifiers and other equipment shall at all times be subject to the approval of the Telephone System.

The initial cable facilities applied for and requested by the Customer hereunder are as shown on the Plan No. 1 Exhibit No. "1" of this Agreement; the date upon which the said cable facilities were made available for use by the Customer being indicated on said plan, which date shall be the effective date for calculation of charges and rentals pursuant to the provisions of Exhibit No. "5" of this agreement.

Applications and requests by the Customer to the Telephone System for cable facilities subsequent to the initial application and request shall be

subject in all respects to all of the foregoing provisions of this clause 1.

A plan shall be prepared, in duplicate, by the Telephone System in connection with each and every application and request by the Customer for cable facilities subsequent to the initial application and request; such plan shall indicate thereon the cable facilities furnished pursuant to such application and request and shall be signed by the parties hereto for identification and shall be attached to and shall be deemed to form part of this Agreement. Each such plan shall be numbered consecutively in the order in which applications and requests are received from the Customer and shall bear the date upon which the cable facilities indicated thereon have been made available for the use of the Customer hereunder, which said date will be the date used for calculation of charges and rentals pursuant to the provisions of Exhibit No. "5" of this Agreement.

2. INSTALLATION OF TELEPHONE SYSTEM CABLE FACILITIES

Cable facilities furnished by the Telephone System pursuant to this agreement will be installed by it, as may be necessary:

a. on poles and pedestal terminals solely owned and solely used by the Telephone System;

b. on poles and pedestal terminals solely owned by the Telephone System and jointly used by it and others;

c. on poles and pedestals jointly owned and jointly used by the Telephone System and others, provided the Telephone System first obtains the

consent of such others;

d. on poles and pedestal terminals solely owned by others and jointly used by them and the Telephone System provided the Telephone System first obtains the consent of such others and provided that in such case the provisions of Clause 11 of Exhibit No. "2" of this Agreement shall apply;

e. in underground conduit systems of the Telephone System;

f. in the ground by means of trenching or "ploughing in". This may or may not be undertaken jointly with local power utilities.

3. CUSTOMER'S OPERATIONS

A. Installation and Maintenance of Coaxial Cable Distribution System Poles

The Customer shall have the right to install and maintain its service drops, amplifiers and other equipment, all of which must be installed and maintained in accordance with the standards set forth in Exhibit No. "3" of this agreement, on poles solely owned and, immediately prior to such installation, solely used by the System, subject as hereinafter provided in this Clause 3A and in Clause 3C of this Exhibit and Clause 11 of Exhibit No. "2" of this Agreement, on poles solely owned by the Telephone System and used jointly by it and others, on poles jointly owned and used by the Telephone System and others, and on poles owned by others and jointly used by the Telephone System and others, upon which the cable facilities have been furnished, installed and established by the Telephone System, for use by the Customer pursuant to this Agreement. All of such poles upon which

the Customer shall install and maintain service drops, amplifiers, and other equipment shall be subject to the provision of this Clause 3A and of Clause 3C of this Exhibit and of Clause 11 of Exhibit No. "2" of this agreement, and the Customer, its workmen and employees, shall have the right to climb such poles for the purpose of installing, inspecting, testing, repairing, maintaining, replacing, disconnecting and removing such service drops, amplifiers and other equipment.

B. Installation and Maintenance of Coaxial Cable Distribution System in Pedestal Terminals

The Customer shall have the right to install and maintain its service drops, all of which must be installed and maintained in accordance with the standards set forth in Exhibit No. "3" of this agreement, in pedestals or joint use pedestals solely owned, and immediately prior to such installation solely used by the Telephone System and, subject as hereinafter provided in this Clause and Clause 3C of this Exhibit and in Clause 11 of Exhibit No. "2" of this Agreement, in joint use pedestal terminals solely owned by the Telephone System and others, upon which the cable facilities have been furnished, installed and established by the Telephone System for use by the Customer pursuant to this Agreement. All such pedestals or joint use pedestal terminals upon which the Customer shall install and maintain service drops and other equipment shall be subject to the provision of this Clause and of Clause 3C of

EXHIBIT NO. "4"

This Exhibit and of Clause 11 of Exhibit No. "2" of this agreement and the Customer, its workmen and employees shall have the right of inspecting, testing, repairing, maintaining, replacing, disconnecting, and removing service drops and other equipment subject to Exhibit No. "3". The Customer shall be liable for any damage to the Telephone System's plant or the plant of others, as a result of access to pedestal terminals.

C. Permission of Joint Owners and Joint Users

The Telephone System agrees where required, to install the cable facilities to be supplied hereunder either on, or in its own poles, ducts or pedestal terminals, and on or in any of the poles, ducts or pedestal terminals of those persons, firms or corporations with whom the Telephone System has any joint ownership or right of joint use on or in such poles, ducts, or pedestal terminals, so long as existing agreements or arrangements, or any continuation or extension thereof, permit the use of such poles, ducts or pedestal terminals by the Telephone System for the above purposes but the Telephone System shall not be liable for any loss incurred by the Customer by reason of the fact that such person, firm or corporation refuses to continue or extend the existing agreements or arrangements with the Telephone System or should such person, firm or corporation refuse to allow the Telephone System to install such cable facilities on or in its poles, ducts or pedestal terminals; should such person, firm or corporation increase their charges to the Telephone System by reason of the fact that CATV service is being supplied through the Telephone System's cable facilities when erected hereunder, then the Telephone System may, in addition to the charges and rentals provided in Exhibit No. "5" hereunder require the Customer to pay all or a part of such additional charges.

EXHIBIT NO. 4

D. C.C.D.S. Drops in Telephone System Ring Run

The Customer shall have the right to place its C.C.D.S. service drop or drops in a ring run installed by the Telephone System provided that:

(a) the total number of service drops(Telephone and/or C.C.D.S.) in the ring run does not at any time exceed three.

(b) the Customer recognizes the prior right of the Telephone System to the use of such ring runs and agrees to remove its service drop or drops at any time at the request of the Telephone System.

E. Prohibited Use of Underground Systems and Pedestal Terminals

No amplifier or other powered equipment shall be placed or allowed to be placed in the underground conduit systems ot the Telephone System, excepting in manholes.

Amplifiers may be placed in manholes or pedestals owned oy the Telephone System or others providing the pwer supply shall not exceed 35 volts A.C.

The Customer, its workmen, or employees shall not be permitted access to the manholes of the Telephone System referred to in this agreement, except when accompanied by a Telephone System employee designated by the System for that purpose, the System's costs in connection therewith to be paid by the Customer.

F. Inspection of C.C.D.S. Plant - Poles

The Customer shall install its service drops, amplifiers and other equipment on the said poles in the manner provided for in Exhibit No. "3" of this agreement and approved by the Telephone System, and

shall at all times maintain the same in accordance with standards satisfactory to the Telephone System, and furthermore, as regards poles owned by others or jointly used by the Telephone System and others, in a manner satisfactory to and approved by the owners or joint owners or joint users of such poles, the whole at its own cost and expense. The Customer will report, as mutually agreed upon, to the Telephone System all service drops installed. The Telephone System may inspect, at the charge set forth in Exhibit No. "5" of this Agreement, all such service drops for the sole purpose of insuring that such service drops do not constitute a hazard to Telephone System plant and/or personnel but such inspection is not in any way to be construed as certification by the Telephone System that any such service drop meets any other standard whatsoever.

G. Inspection of C.C.D.S. Plant - Pedestal Terminals

The Customer shall install its service drops in the said pedestal terminals in the manner provided for in Exhibit No. "3" of this Agreement and approved by the Telephone System and shall at all times maintain the same in accordance with standards satisfactory to the Telephone System, and furthermore, as regards to pedestal terminals owned by others, or jointly used by the Telephone System and others, in a manner satisfactory to and approved by the owners of such pedestal terminals, the whole at its own cost and expense. The Customer will report, as mutually agreed upon, to the Telephone System all service drops installed. The Telephone System may inspect, at the charge set forth in Exhibit No. "5" of this Agreement, all such service drops for the sole purpose of insuring that such service drops do not constitute a hazard to Telephone System Plant and/or personnel but such inspection is not in any way to be construed as a certification by the Telephone

RENTALS AND CHARGES

Section 1 - RATES

A (1) ADVANCE PAYMENT

The Customer at the time of the execution of this contract shall deposit $250,000.00 in cash with the Telephone System or may at its option deposit with the Telephone System in lieu of $250,000.00 cash, 30 day term deposit certificates in denominations of $25,000.00 issued by any Canadian Chartered Bank in the total face value of not less than $250,000.00 as an advance payment against non-recurring construction charges which shall be credited to the Customer in the final accounting between the parties during the construction of the last project which is to be carried out under this agreement and which certificates shall entitle the Telephone System upon demand to recover from the bank all or any part of the said deposit of $250,000.00 forthwith upon demand without the consent of the Customer or any other formality but which certificates shall entitle the Customer to receive the interest accumulations thereon as the same accrues from time to time.

(2) CHARGES AGAINST ADVANCE PAYMENT

The Telephone System may charge against the advance payment or deposit of $250,000.00 referred to in paragraph A (1) of this Exhibit, any preliminary engineering, supervision, overhead, or other construction charges incurred by the Telephone System

between the date of the execution of this Agreement and the receipt by the Telephone System from the Customer of its first payment of 1/3 of the estimate of the cost of the first construction project to be carried out hereunder, and the Telephone System may, at any time, invoice the Customer from time to time for the amount of its expense up to the time of invoicing, and the Customer shall, forthwith, pay the amount of such invoice to the Telephone System so as to restore the advance payment to its original level of $250,000.00.

After the Telephone System has notified the Customer of the amount of the estimate of the first project and

EXHIBIT NO. "5"

the Customer has remitted its initial 1/3 payment of said estimate, the Telephone System may thereafter, from time to time, either with respect to the first construction project, or any other construction project, charge against the said advance payment any amounts that are necessary for the said Telephone System to expend on construction charges in connection with any such construction project, when the payments made by the Customer to the Telephone System with respect to the project or projects under construction are not enough to cover the amount of such construction charge expenses incurred by the Telephone System: when the said advance payment is reduced below $250,000.00 by reason of any charges made against it as aforesaid, then the Telephone System may from time to time invoice the Customer for the deficiency and the Customer shall forthwith, on being invoiced therefor, pay to the Telephone System sufficient monies to restore the advance payment to its original level of $250,000.00.

(3.) NON-RECURRING CONSTRUCTION CHARGES

The Telephone System shall from time to time when requested by the Customer, supply the Customer with an estimate of the total non-recurring construction charges for any construction project whether it consists of the whole of areas 1, 2, and 3 as shown on Schedule "A" hereto, or any one of the said areas, or any part of any one of the said areas, and upon the Customer advising the Telephone System

EXHIBIT NO. "5"

in writing that it wishes the Telephone System to proceed with construction of such project, the Customer shall pay to the Telephone System the amount of such estimate at the following times:

(i) 1/3 of the amount of the estimate forthwith at the time the Customer gives written notification to the Telephone System requesting the Telephone System to proceed with construction of the project.

(ii) 1/3 of the amount of said estimate forthwith upon the Customer being advised in writing by the Telephone System that it is prepared to begin construction.

(iii) The remainder of the project cost shall be paid by the Customer on the basis of progress payments submitted by the Telephone System from time to time after commencement of construction, within thirty (30) days after the presentation to the Customer by the Telephone System of its invoice verifying the non-recurring construction charges therein. Upon completion of any one project, the Telephone System shall, so soon thereafter as it is able, invoice the Customer with the balance of the actual construction charges for that project and the Customer shall forthwith pay the same.

For the purpose of construction of CATV distribution facilities, Metropolitan Winnipeg has been divided into six areas numbered 1 to 6 inclusive as shown on the map attached hereto as Schedule "A" and when

reference is made herein, or in the agreement to a numbered area, it refers to the numbered area on the said map.

The non-recurring construction charges shall consist of the complete cost of all cable and other material, work, labour, engineering costs, loading charges and overhead required to make the cable facilities available to the Customer. When assessing the cost of a joint use pedestal terminal the Customer shall pay 50 percent of the Telephone System's cost excluding connectors in the terminal. In a non-joint use pedestal terminal the Customer shall pay the full cost. The Telephone System's cost shall mean material, labour, cartage and loading charges.

(4) MONTHLY RENTAL CHARGES

Per 100 feet of co-axial cable tube

either aerial or underground - $ .60

B. REPAIR AND MAINTENANCE

Repair and maintenance of the cable facilities on a call-out basis will be performed by or through the Telephone System only and the Customer will be charged the cost of all material, labour,

EXHIBIT NO. "5"

supervision, overhead, engineering, motor vehicle, contract work and other incidental expenses . "Labour" referred to above shall be charged for in the amount the Telephone System is required to pay under its wage agreements.

C. SERVICE DROP INSPECTION

For each initial and for each subsequent inspection of the same service drop prior to acceptance, two dollars ($2.00) per inspection.

SECTION 2 - Payments

The Customer will pay the non-recurring construction charges and the monthly rentals referred to in Section 1A of this Exhibit in the following manner:

(a) Non-recurring construction charges shall be payable as set out in Section 1A of this Exhibit.

(b) Monthly rental charges set out in Section 1A of this Exhibit shall become due and payable in advance of the first day of each and every calender month during the continuance of this Agreement commencing on the date when the Telephone System notifies the Customer that the construction in any area or portion thereof has been completed and is ready for service.

(c) Non-recurring construction charges in respect of the Customer's requirements for future cable facilities shall be payable by the Customer as prescribed by the Telephone System at the time of each application by the Customer for extension of such cable facilities.

(d) All service drop inspection charges and call-out repair and maintenance charges shall become due and payable by the Customer within thirty(30) days after completion of the necessary work by the Telephone System and presentation of accounts therefor.

The monthly rentals hereinbefore set forth shall be subject to adjustment as provided for in Article 7 of this agreement and,without restricting the generality of the foregoing, such adjustments may include any increased charges by any person, firm or corporation for the use of joint-use poles or pedestal terminals for C.A.T.V. cables under this agreement in addition to any changes in all the other factors comprised in the basic monthly rental charges set out in Section 1 A of this Exhibit.

Maintenance work undertaken by the Telephone System will be paid for by the Customer in accordance with the scale of charges set out in Article 7 of this agreement.



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