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Ownership in the broadcasting industry

by Stuart McFadyen, Colin Hoskins and David Gillen.

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OWNERSHIP IN THE BROADCASTING INDUSTRY

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= Study of Ownership
= Study of Economic Concentration.

TABLE OF CONTENTS

Models used in these chapters

1. INTRODUCTION: TELEVISION, RADIO AND CABLE-TELEVISION IN CANADA

Canada has in general focused on the use of the mass media to protect and promote the Canadian identity with little attention paid to economic consequences of such action. With the emphasis on the 'social' use of the media, restrictive licencing and content regulation have been emphasized with little attention paid to the ramifications of such myopic economic regulation. A casual glance on any day at the stock prices of media firms reveals a profitable industry indeed. But profits are not of prime importance, rather it is both the generation and use of profits to obtain substantial economic and hence political power. Regulation creates certain artificial barriers to entry thereby generating rents or excess profits to individuals or groups who are fortunate enough to be protected. These rents may then be utilized to expand either vertically or horizontally within the industry giving rise to greater profits and substantial economic power. This study examines the state and effects of ownership and cross-ownership on various conduct and performance measures.

Bigness and economic power are not synonomous. However size does tend to confer economic as well as political advantages and therefore influence the nature and extent of rivalry within the industry. It is therefore useful to examine the absolute size of each medium and relative size within the media.

1.1 Television

Private television in 1975 had a total of 65 corporations which controlled a total of 189 stations. CTV affiliates were 157,

6 TVA affilites, 6 Global stations, 14 independents and 6 stations of OECA. These television corporations obtained a total revenue of $233.57 million, incurred total operating expenses of $193.98 million, owned $97.9 million in net assets, obtained a net after tax operating profit of $10.57 million which give rise to a 30% rate of return on assets.

The public corporation, the CBC, had a total of 234 affiliates and owned and operated another 238 stations. Of these stations, the English network reaches 91% of the population while the French network reaches 68%. The CBC in 1974, received a total of $232,796,000 million in parliamentary appropriations, gross advertising revenues provided an additional $60,202,000 million. Since the CBC is not a profit maximizing firm, but rather attempts to maximize Canadian content, it expends substantially more on programming. The private television sector spent approximately 48% on programming while the CBC spent 60% of its total expenses on programming, 47% of which was for salary and wage expenses.

A study of Tables 1.1 and 1.2 suggests that large firms make substantially greater profits than their next closest size group. Also, that profits are higher for small and large firms than those in between. One does note, however, that the number of firms is more evenly distributed over size classes in radio than in television. This presumably is a reflection of both the economies of scale but also the initial threshold investment required for production. The program costs for television also tend to be higher and with the Canadian content rules, a distortion among firm sizes is introduced. For example, the CBC paid an average of $15,596 per hour to produce

TABLE 1.1

FINANCIAL SUMMARY, PRIVATE TELEVISION 1975
(in millions of dollars)

	Stations by Revenue Group				
	$4.5 and over	$1.8 to $4.5	$1.0 to $1.8	Under $1	Total
Number of corporation	13	17	16	16	65
Total revenue	152.412	48.005	22.746	10.408	233.571
Non-programming operating expense	52.008	19.122	9.701	5.646	86.476
Programming expenses	64.807	21.186	7.122	3.198	96.313
Total operating expense	116.815	40.308	16.823	8.844	182.789
Depreciation	6.553	2.168	1.467	1.012	11.200
Total expenses	123.368	42.476	18.290	9.856	193.989
Net operating profit before tax	29.044	5.528	4.457	.551	39.580
Provision for income tax	15.467	2.998	2.134	.410	21.010
Net operating profit after tax	13.577	2.530	2.322	.141	18.571
Net tangible assets	68.743	12.136	8.776	8.245	97.900

Note:

Property, plant and equipment net of accumulated depreciation at August 31, 1975 (Total) for private TV and radio stations was $142,154,753 and for CBC was $212,243,000.

its own programs while paying only $4,718 on average for procured programs. Local stations paid $2,940 per hour for CBC produced programs while paying $187 per hour for procured programs.

The television industry has approximately twice the amount of assets as radio, one quarter the number of corporations, only slightly more total revenues but substantially higher profits. The assets, revenues and profits and therefore the economic power is concentrated in significantly fewer hands in television than in radio. This concentration of power is even more significant if one takes account of the substantial cross-ownership between the two mediums.

1.2 Radio

In 1975 there were a total of 282 radio stations operating within Canada, ranging in size, measured by revenue, from a small of less than $100,000 per year to over two million dollars per year. The average revenue for radio stations was approximately three quarters of a million dollars; a figure higher than the average in other industries. Table 1.2 depicts the resources available to private radio. The industry (radio) had total revenues of $208.24 million, incurred total operating expenses of $171.12 million, had $15 million in net operating profit after tax and received a net rate of return of 18% on assets.[1] This quantitative assessment provides a clear indication of the sizable magnitude of resources controlled by and generated from radio licence holders. This is by no means a complete picture due to group ownership within and across the media. The above figures represent minimums.

TABLE 1.2

FINANCIAL SUMMARY, PRIVATE RADIO 1975
(in millions of dollars)

	Stations by Revenue Group										
	$1.7 and Over	$1 to $1.7	$.7 to $1	$.58 to $.7	$.434 to $.58	$.349 to $.434	$.273 to $.349	$.184 to $.273	$.107 to $.184	Under $.107	Total
Number of stations	28	28	28	29	28	28	29	28	28	28	282
Total revenue	85.190	36.272	22.903	18.434	13.932	10.618	8.825	6.312	4.090	1.663	208.239
Non-programming operating expense	42.895	19.099	12.522	10.929	8.271	6.237	5.538	3.577	2.655	1.233	112.953
Programming expenses	21.543	10.267	6.867	5.479	4.176	3.283	2.854	1.906	1.401	.393	58.169
Total operating expense	64.438	29.366	19.389	16.408	12.447	9.520	8.392	5.483	4.056	1.626	171.122
Depreciation	1.688	1.250	.741	.546	.482	.449	.368	.301	.175	.137	6.138
Total expenses	66.126	30.616	20.130	16.954	12.929	9.969	8.760	5.784	4.231	1.763	177.260
Net operating profit before tax	19.064	5.655	2.773	1.480	1.003	.648	.065	.529	-.141	-.100	30.978
Provision for income tax	10.157	2.858	.797	.588	.318	.359	.128	.114	.028	.013	15.359
Net operating profit after tax	8.907	2.798	1.976	.893	.685	.289	-.063	.415	-.168	-.113	15.619
Net tangible assets	12.808	9.101	5.199	4.139	4.136	3.884	3.079	2.816	1.952	1.397	48.511

Note:

Property, plant and equipment net of accumulated depreciation at August 31, 1975 (Total) for private TV and radio stations was $142,154,753 and for CBC was $212,243,000.

In addition to the private sector in radio, the public Canadian Broadcasting Corporation owned and operated 50 AM and 30 FM radio stations. As of 1975, the CBC also had $212,243,000 in net assets for both radio and television.

1.3 Cable TV

In 1975 there were 423 cable systems licenced in Canada, however, 35 were non-operational which leaves 388. The 388 systems were controlled by 305 Business Organizations, 47% were single owned and 53% group owned. The group owned obtained 77% of the gross revenue or approximately $122 million while the single owned obtained 23% of gross revenues.

Table 1.3 depicts the macro characteristics of the cable television industry in 1975. Total revenues were $158 million, significantly less than both radio and television, but total operating expenses were also significantly less (less than half) than radio or television, being $83.396 million. Cables total assets are significantly larger than radio or television, at $149.612 million, a large portion of which is in the trunk cable and drop-offs. The net after tax profits amounted to $15.671 million, approximately the same as the other mediums. The distribution over firm sizes is similar to that of radio and television in that large and small firms are more profitable than the medium size firms.

Cable has made substantial inroads in the markets in Canada. In 1975, 40% of homes in areas licenced for cable had access to cable and approximately 74% of the homes passed by cable were cable subscribers. This is reflected in the increased rate of return that cable has experienced over the last few years to an average of 24% in 1975.

TABLE 1.3

FINANCIAL SUMMARY, CABLE TELEVISION 1975
(in millions of dollars)

	Stations by Total Asets										
	$4.5 and Over	$2.48-$4.5	$1.19-$2.48	$.65-$1.19	$.45-$.65	$.305-$.45	$.218-$.305	$.147-$.218	$.105-$.147	$.105 and under	Total
Business organizations	86.052	27.95	14,741	9.418	6.58	4.872	3.579	2.527	1.952	1.093	158,768
Non-programming operating expense	39.156	12.774	7.584	5.24	4.145	3.055	2.172	1.648	1.164	.808	77.242
Programming expense	3.112	1.339	.512	.465	.164	.208	.132	.113	.091	.012	6.152
Total operating expense	42.270	14.113	7.584	5.705	4.311	3.263	2.305	1.763	1.256	.820	83.396
Depreciation	18.330	5.252	3.086	1.766	.912	1.133	.720	.426	.401	.196	32.226
Total expenses	60.600	19.365	10.670	7.471	5.221	4.396	3.625	2.189	1.657	1.016	115.622
Net operating profit before tax	19.156	5.654	2.765	1.154	1.603	.63	.293	.058	.176	.061	30.987
Provision for income tax	9.679	2.706	1.166	.834	.430	.182	.149	.076	.066	.023	15.315
Net operating profit after tax	9.476	2.947	1.599	.319	1.173	(.119)	.143	(.018)	.110	.038	15.671
Net tangible assets	83.306	23.696	14.893	7.635	7.793	3.976	2.920	1.983	2.273	1.133	149.612

Source: Statistics Canada, Catalogue 56-205

1.4 The macro characteristics of radio, television and cable suggests substantial pools of economic resources generating growing revenues and high rates of return. It is also evident that a large variation in the size distribution among firms occurs in both cable and television while not in radio. Furthermore, there is evidence of substantial within media group and cross-media ownership. It is to this question we now turn. That is, given the general characteristics of the various media, how has this differential ownership influenced the magnitude and distribution of economic power and what are the implications for certain performance measures, such as, price and profits?

Chapter two examines structural characteristics of the various media; television, radio and cable. Description of the ownership pattern within and across media are provided. The information concerning concentration is then utilized in the later chapters dealing with performance measures.

Chapter three discusses alternative measures of industry profit performance. Weighted average rate of return measures are developed for corporations and groups of the radio and television industries. The rates of return in these media are compared to rates of return in other non-media industries taking account of different risk between the two distinct industries.

The report then moves from a macro mass media analysis to a micro within media analysis. Chapter four describes characteristics of Canadian television markets and provides the rationale for the selection of the sample of 14 major markets and the firms contained

herein. Measure of concentration utilizing the Herfindahl index are made on the basis of both audience and revenue market shares. Group ownership and cross-ownership is identified in each market. Chapter five is basically concerned with developing and estimating the demand for television audience size. Estimates are provided directly from a reduced form equation and are evaluated in terms of prior economic expectations and the results of other studies. A simultaneous equation model of the determinants of price-advertising rates is provided in chapter six. The ad rates, we argue, are a function of ownership and market characteristics as well as variables indicating the degree of competition in the market place. In chapter seven, the profits of television firms are investigated. The measure utilized is the price-cost margin. This was necessary because asset information is provided only on a corporate level.

Chapter eight through eleven do for radio what chapters four through seven did for the television industry. The models are the same except for the analysis and profits in chapter eleven. Here we were able to obtain direct profit measures and the profitability is therefore evaluated in terms of both price-cost margin and rates of return.

Chapter twelve examines program performance for televison and radio. The balance, diversity and choice of programs, both across and within markets and by network affiliation is examined. We argue that these three program characteristics will be a function of the number and type of station as well as the financing of the industry.

A complete analysis of the cable-television industry is contained in chapter thirteen. First, the macro characteristics of the largest firms are presented, including financial and subscriber characteristics. A simultaneous equation model of the cable industry is estimated. This includes estimates on demand, price and cost equation. From these estimations we are able to investigate differences in the economies of density and economies of scale and thus determine the optimal size of cable firm as well as their distribution in markets of various sizes. The profitability of the cable industry is also examined with particular attention to the pricing practices which yield above market rates of return in the industry. Finally, a comparison is made between alternative pricing regimes and the implication for industry profits.

The summary and conclusion are contained in chapter fourteen.

CHAPTER 1

FOOTNOTES

1. This figure is a downward biased measure of the return on shareholders equity since many stations were highly levered.

2. OWNERSHIP IN THE TELEVISION, RADIO, AND CABLE-TELEVISION INDUSTRIES

Examination of ownership patterns in the television, radio, and cable-television industries provide both an understanding of the ownership structure and a basis for further analysis. The ownership of these industries in Canada is characterized by large group holdings and these group holdings may have significant economic ramifications. In order to evaluate this, we analyze group holdings and in subsequent chapters attempt to identify the impact on economic performance and programming performance of these group holdings. The basic approach of this study, however, is to examine ownership on a market-by-market basis in order to identify areas of concentrated ownership and potential market power. The first three sections in this chapter provides description of the holdings of the large media groups in television, radio, and cable-television respectively. This information on concentration in terms of a nation-wide market definition is then used in subsequent chapters to evaluate its importance for various pricing and programming decisions. The final section of the chapter develops the rationale where the market-by-market approach to concentration which is also tested in subsequent chapters.

The Canadian Radio-Television and Telecommunication Commission (hereafter CRTC) issues licences to individuals or corporate entities to undertake broadcasting receival and transmittal. In order to properly define group holdings, a definition of corporate control must be established. Following Magun we define corporate control as more than half or the largest single ownership interest in voting shares, whichever

is applicable.[1] As Magun points out, this definition implies control is exercised through voting stock. Other control arrangements could be voting trust agreements or the holding of debt in a corporation which has a high debt/equity ratio.

The ownership control is divided accordingly:

i) Single plant firm; one in which no more than one plant of the same medium is controlled.

ii) Group ownership; multi-plant firm in which more than one plant in the same medium but not necessarily the same market, is controlled.

iii) Group cross-ownership; multi-plant firm in which more than one plant between media is controlled (again, not necessarily in the same market).

Information on the radio, television, and cable-television, revenues and assets of media group owners was obtained from Volume Two of the report of the CRTC Ownership Study Group.[2] Information on group holdings outside these industries was obtained from The Financial Post, Report on Media, May, 1976.[3]

2.1 Ownership in the Television Industry

In September 1975 there were 64 private commercial television stations in Canada. These included parent, full-time and part-time, program originating stations and excluded rebroadcasters. Of the 64 stations, 28 were owned by firms which owned only a single television station while the remaining 36 were group-owned. The average gross revenue in 1975 was 3.4 million dollars for a group-owned station and 2.8 million dollars for a single-owned station.

Television groups vary widely in size. The leading four ownership groups, Baton, Télé-Métropole, Southam-Selkirk and B.C. Television (Western), together account for forty percent of industry revenue. The size of the market in which a group's stations are located is an important determinant of relative group size. For example, the top two groups, Baton, and Télé-Métropole, which own CFTO-TV in Toronto and CFTM-TV in Montreal, account for twenty-four percent of total industry revenue.

The top ten groups, consisting of a total of 21 television stations, account for sixty-five percent of total industry revenue. Tables 2.1 - 2.10 which follow, show for each group owner the television stations, AM and FM radio stations, newspapers, and cable systems owned, as well as indicating the market in which each is located. Holdings in other industries are noted at the foot of the table.

TABLE 2.1

BATON GROUP

Television Stations	AM Ladies Stations	FM Radio Stations	Newspapers	Cable Systems	Market
CFTO					Toronto
	CFGO				Ottawa
	CKLW	CKLW			Windsor
CFQC	CFQC				Saskatoon

Other interests:

Subsidiary: Glen-Warren Productions Ltd. (1007.)

TABLE 2.2

TÉLÉ-METROPOLE GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
CFTM					Montreal
CJPM(50%)					Chicoutimi, Que.

Other Interests:

Subsidiaries; Paul L'Anglais Inc.
J.P.L. Productions Inc.

TABLE 2.3

SOUTHAM-SELKIRK GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
CHAN/CHEK(41%)[1]	CKWX		Vancouver Province		Vancouver
CHCH			Hamilton Spectator		Hamilton
	CJCA	CJCA	Edmonton Journal		Edmonton
CFAC	CFAC		Calgary Herald		Calgary
	CJVI				Victoria
CJOC	CJOC				Lethbridge
CHBC(33%)					Kelowna
	CJPR				Blairmore, Alta.
	CJIB				Vernon, B.C.
	CFGP				Grande Prairie
				Ottawa Cablevision Ltd.(35%)	
				Lake Superior Cablevision Ltd.(33%)	
				Greater Winnipeg Cablevision Ltd.(50%)	

Other Interests:

Subsidiaries:
- All Canada Radio & Television Ltd.
- Selkirk Communications Ltd. (owns 43% of London Broadcasting Co.)
- British Columbia Broadcasting System Ltd.(41%)
- Radio Sales & Marketing Ltd.
- Quality Records Ltd.
- Robert Lawrence Productions (Canada) Ltd.(60%)
- Selcom Inc.(65%)

Affiliate:
- Beacon Broadcasting Ltd., England(30%)

[1] Majority of shares in CHAN/CHEK are owned by Western Broadcasting group.

TABLE 2.4

WESTERN BROADCASTING GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
CHAN/CHEK					Vancouver
	CKNW	CFMI			Vancouver
	CJOB	CJOB			Winnipeg
	CHML	CKOS			Hamilton
	CHQR				Calgary

Subsidiaries:
Western Productions Ltd.
Western Broadcasting (Sports) Ltd.
Northwest Sports Enterprises Ltd. and
Vancouver Hockey Club Ltd., both 69% owned.
British Columbia Television Broadcasting System Ltd.(50%).
Little Mountain Sound Co.(50%).
Other Interests:
Harlequin Enterprises Ltd.(16%)
Toronto Star (about 188,000 non-voting B shares).

TABLE 2.5

MULTIPLE ACCESS GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
CFCF	CFCF	CFQR			Montreal

Champlain Productions Ltd.
Unstated interests held in Alexander Pearson and Dawson Inc. and Paul Mulvihill Radio Ltd.
AGT Data Systems (99%), which owns the computer group.
Subsidiary:
TCC Inc. Texas(51%).

TABLE 2.6

CHUM GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
	CHUM	CHUM			Toronto
	CFUN				Vancouver
	CFRA	CFMO			Ottawa
	CFRW	CHIQ			Winnipeg
CJCH(51%)	CJCH				Halifax
	CKPT(80%)				Peterborough
CKCW					Moncton/Charlottetown
CJCB					Barrie, Ont.
CJCB(50%)					Sydney, N.S.
CKLT					Saint John

Subsidiaries:
National Security Systems Ltd. Goldfarb Consultants Ltd.(82%), Intertask Ltd.(58%), Accu-Tab Computer Services Ltd.
Franchise:
"Music by Musak".

TABLE 2.7

TÉLÉ-CAPITALE GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
	CKLM				Montreal
CFCM	CHRC	CHRC			Quebec City
CKMI					Quebec City

Other Interests:
Tele-Capital Unicorn Ltd.
Immeubles Télé-Capital Ltd.
Cine Capital Distributers Ltd.(51%)
Les Productions du Verseau Inc.(40%)
Cinevideo Inc.(40%)

TABLE 2.8

IWC-SLAIGHT GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
CKGN	CFGM				Toronto
	CFOX(80%)				Montreal
	CHOK				Sarnia, Ont.

Subsidiaries:
- Barrie Cable TV Ltd.
- Orillia Cable TV Ltd.
- Terra Communications Ltd.
- Global Communications Ltd.(control).

TABLE 2.9

STANDARD GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
	CFRB	CKFM			Toronto
	CJAD	CJFM			Montreal
CJOH(52%)					Ottawa

Subsidiaries:
- Standard Broadcast Sales Co.
- Canadian Standard Broadcast Sales Inc.
- Standard Broadcast Productions Ltd.
- Standard Sound Systems Co.
- Standard Broadcasting Realty Ltd.
- Standard Broadcasting Corp., England
- St. Clair Productions Ltd.
- Broadcast Marketing Services Ltd., England(75%)
- Bushnell Communications Ltd.(52%)

Associated minority interests in England:
- Capital Radio Ltd.
- Radio City (Sound of Merseyside) Ltd.
- North East Broadcasting Co.
- Plymouth Sound Ltd.
- Bradford Community Radio Ltd.
- Radio Trent Ltd.

TABLE 2.10

BLACKBURN GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
CFPL CKNX	CFPL CKNX	CFPL	London Free Press		London, Ont. Wingham, Ont.

Information on other holdings not available.

2.2 Ownership in the Radio Industry

In 1975 there were 376 private, program originating AM-FM radio stations. This total excludes non-commercial stations and CBC stations. Eighty-one percent of all private radio stations were group owned. This large percentage is partly a result of the common occurrence of AM-FM twins. The average gross revenue of a group-owned radio station was $585,000 compared to $456,000 for a single-owned station.

The ten largest radio groups accounted for forty-four percent of all radio industry revenues during 1975. As in the case of television, a large proportion of this concentration of revenue resulted from the location of group owned stations in major markets. For example, the two largest groups, Standard and CHUM, account for fourteen percent of industry revenue. The Standard groups holdings include CFRB-AM in Toronto and CJAD-AM in Montreal. CHUM owns CHUM-AM in Toronto, CFUN-AM in Vancouver, CFRW-AM in Winnipeg and CFRA-AM in Ottawa.

The holdings of the ten largest radio groups, which account for 74 radio stations, and forty-four percent of total radio industry revenue, are shown in Tables 2.11 to 2.20 which follow. Since the four largest, and the eighth largest, radio groups are owned by concerns which were in the top ten television groups, the reader is referred to the earlier description of group holdings. These groups which have major holdings in both the television industry and the radio industry are the Standard group, CHUM group, the Western group, the Southam-Selkirk group, and the Baton group.

TABLE 2.11

STANDARD GROUP

See table 2.9

TABLE 2.12

CHUM GROUP

See table 2.6

TABLE 2.13

WESTERN GROUP

See table 2.4

TABLE 2.14

SOUTHAM-SELKIRK GROUP

See table 2.3

TABLE 2.15

MACLEAN-HUNTER GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
	CKEY				Toronto
	CFCN(60%)				Calgary
	CHYM	CHYM			Kitchener, Ont.
	CFCO				Chatham, Ont.

Subsidiaries:
- Maclean-Hunter Cable TV. Ltd.(62%)
- Combined Communications Ltd.
- Westbourne-Maclean-Hunter (Proprietary)(70%)
- Design Craft Ltd.
- Co-operative Book Centre of Canada Ltd.
- Macmillan Co. of Canada
- I.D.C. Publishing Co.
- Metro Toronto News Co. Ltd.
- Professors Den Bookstores of Canada Ltd.
- Somerset Specialties Ltd.
- Telephone Communications Canada Ltd.(51%)
- Maclean-Hunter Ltd. (Britain)
- Maclean-Hunter Publishing Corp. (U.S.)

50% owned:
- Trans Canada Expositions Ltd.
- KEG Productions Ltd.
- Quality Service Programs Inc.
- Sinnott News Co.
- Tarifmedia SA, Paris
- Media-Daten, Verlagsgesellschaft m.b.h., Frankfurt
- Media-Daten, Oesterreichisches G.m.b.h., Vienna
- Media-Daten, Zurich
- Datie Tariffe Pubblicitarie S.p.A., Milan
- Corena Ltda, Sao Paulo.

Owned by Subsidiaries:
- International Exposition Services Inc.(50%)
- Paul Mulvihill Ltd.(49%)

TABLE 2.16

CIVITAS GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
	CJMS	CKMF			Montreal
	CJRC				Ottawa
	CJRP				Quebec City
	CJTR				Trois-Rivieres
	CJRS				Sherbrooke

Information on other holdings not available.

TABLE 2.17

TELEMEDIA-BEAUBIEN GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
	CKAC				Montreal
	CKCH	CKCH			Hull
	CKCV				Quebec City
	CHLN				Trois-Rivieres
	CHLT	CHLT			Sherbrooke
	CKTS				Sherbrooke
	CJBR	CJBR			Rimouski, Que.
	CJBM				Causajscal, Que.

Information on other holdings not available.

TABLE 2.18

BATON GROUP

See table 1.

TABLE 2.19

MOFFAT GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
	CKLG	CKLG			Vancouver
CKY	CKY	CKY			Winnipeg
	CHED (45%)				Edmonton
	CKXL	CHFM			Calgary
	CHAB				Moose Jaw, Sask.

Other Interests:
Relay Communications Ltd. (50%).
Winnipeg Vidcon Ltd. (80%)
Media Tours Ltd. (90%)
Sibbald Arms Ltd. (45%)

TABLE 2.20

STIRLING GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
	CKGM	CHOM			Westmount (Montreal)
	CKWW	CJOM			Windsor
	CJON				St. John's
	CJOX				Grand Bank, Nfld.
	CJCN				Grand Falls, Nfld.
	CJCR				Gander, Nfld.

Information on other holdings not available.

2.3 Ownership in the Cable-Television Industry

There were about 350 cable-television systems in operation in Canada in 1975. As in the case of radio and television, group-owned cable-television systems were generally larger in size than systems owned by owners of a single system. The average gross revenue of a group-owned system was $643,000 as compared to $230,000 for a single-owned system. The fifty-three percent of systems that were group owned accounted for seventy-seven percent of industry revenue.

The largest group, Premier, controls eight systems -- York Cablevision, Canadian Wirevision, Oakville Cablevision, Coquitlam Cablevision, Keeble Cable-Toronto, Keeble Cable-Mississauga, Borden Cable and Victoria Cablevision accounts for thirteen percent of total Canadian cable television revenues. The four largest groups Premier, Cablesystems, Nationale and Maclean-Hunter, account for forty-one percent of total revenue. The cable-television and broadcasting industry assets of the ten largest cable groups, which account for sixty-four percent of overall cable-television revenues, are described in Tables 2.21 to 2.30.

TABLE 2.21

PREMIER-GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
				York Cablevision	Toronto
				Keeble Cable(90%)	Toronto
				Keeble Cable(90%)	Mississauga
				Oakville Cablevision	Oakville
				Canadian Wirevision	Vancouver
				Coquitlam Cablevision	Coquitlam
				Victoria Cable	Sannich
				Borden Cable	Camp Borden

Other Interests:

Albion Cablevision Ltd., Britain(75%)
Albion Cablevision Ltd., Britain(75%)
Marlin Communal Aerials Ltd., Ireland(87%)
Delta-Benco Ltd.(24%)
Northwest Sports Enterprises Ltd.(11 1/2%)
Vancouver Professional Soccer Ltd.(7%)
Stuart Plastics Ltd.(80%)

TABLE 2.22

CABLESYSTEMS GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
				Metro Cable	Toronto-Burlington,Miss
				Grand River Cable TV	Kitchener-Stratford
				Hamilton Co-Axial	Hamilton, Ont.
				London Cable TV	London, Ont.
				Cornwall Cablevision	Cornwall, Ont.
				Kingston Cable TV.(50%)	Kingston
				Chatham Cable TV.(50%)	Chatham
				Pine Ridge Cable	Oshawa-Bowmanville
				Jarmain Cable TV.	Newmarket
				Jarmain Cable TV.	Brantford

Other Interests:
Alberni Cable Television Ltd.(20%)
Bushnell Communications Ltd.(6.3%)
Tele-Capital Ltd.(18%)
Edmonton World Hockey Enterprises Ltd.(30%)
Cableshare Ltd.(50%)
Agra Industries Ltd.(2%)

TABLE 2.23

NATIONALE GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
				National Cablevision	Montreal
				National Cablevision	Sherbrooke
				National Cablevision	Victoriaville
				National Cablevision	Ville de Laval
				National Cablevision	Cap Madeleine
				Telecable de Quebec Inc.	Quebec
				Cablevision du Nord de Quebec	Rouyn-Noranda
				Cablevision du Nord de Quebec	Malartic
				Cablevision du Nord de Quebec	Val d'Or

No data available on other interests.

TABLE 2.24

MACLEAN-HUNTER GROUP

See table 2.15

TABLE 2.25

ROGERS GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
	CFTR	CHFI		Rogers Cable	Toronto
				Co-axial Colourview	Toronto
	CHAM				Hamilton
	CKJD				Sarnia, Ont.
	CHYR			Rojers Management	Leamington
				Bramelea Telecable	Brampton

No data available on other interests.

TABLE 2.26

CABLECASTING GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
				Graham Cable TV	Toronto
				Greater Winnipeg Cablevision Ltd.(50%)	Winnipeg
				Calgary Cable TV(64%)	Calgary
				Huron Cable TV Ltd.(33%)	Sonia/Wallaceburg
				Allview Cable Service Ltd.	St. Thomas, Ont.

TABLE 2.27

SOUTHAM-SELKIRK GROUP

See table 2.3

TABLE 2.28

SHAW GROUP

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
				Capital Cable	Edmonton
				Capital Cable	Spruce Grove
				Capital Cable	Leduc
				Capital Cable	Fort Sask.
				Revelstoke Cable TV	Revelstoke
				Kelowna Cable	Kelowna
				Penticton Cable TV	Penticton
				Penticton Cable TV	Hedley
				Western Cable TV	Woodstock

No data available on other interests.

TABLE 2.29

CABLE TV LTD.

Television Stations	AM Radio Stations	FM Radio Stations	Newspapers	Cable Systems	Market
				Cable TV Ltd.	Montreal-Ville de Laval

TABLE 2.30

MOFFAT GROUP

See table 2.19

2.4 Market-by-market Concentration in Television, Radio and Cable-Television

This study emphasizes the effects of ownership and integration on various conduct and performance measures (discussed below). A first step in dealing with these issues is to examine structural measures of concentration. We begin with structural measures since the well utilized paradigm of structure-conduct-performance of the industrial organization literature suggests more or less a unidirectional causality from structure to behavioral measures.[4] Furthermore, it suggests that permanent improvements in behavior or conduct with resulting changes in the measure of performance, is best achieved via structural changes.

The structural measures are not measures of 'rivalry' per se but are indicators of the likelihood of rivalry. It is therefore best at the outset to distinguish between 'structural competition' and 'behavioral competition' since confusion always occurs with the use of these terms. Competition we take to mean as industries characterized by large numbers of firms which have no market power, whereas rivalry we take to mean as the conduct or behavior of firms. Therefore structural measures only <u>suggest</u> that rivalry is more or less likely to occur, they are <u>not</u> measures of rivalry.

The principal dimensions of structure are the number and size distribution of firms and degree of product differentiation within the market place. This suggests that a measure of competition must take account of the first two elements and that care must be taken in properly defining the relevant market; since the structural measure overall is a measure of <u>market</u> power.

In defining the market one must take account of substitution possibilities in both consumption and production. For the former, the market can be defined in terms of the cross elasticity of demand - for substitutes the sign of this elasticity is positive. On the supply side, firms may be market competitors if they employ similar skills and capital equipment and there are immaterial barriers preventing firms from entering each others product lines. As well, one needs to consider import competition, the existence of local or regional markets and product ties. Finally, market power is understated if markets are defined to include non-substitutes, when the defined market is greater than it in fact is (for example, defining a national market when the appropriate one is regional or local), and when producers have product ties, brand loyalties or franchising. Market power is overstated if substitutes are excluded and significant import competition is excluded.

Structure measures of competition are referred to as concentration measures. There exist a large number of such measures but few have the preferred properties to truly reflect market power. Hall and Tideman have noted that the most desirable properties of concentration measures include: unidimensional unambiguous measure; that it depend on and is sensitive to the relative size distribution and changes therein of firms within an industry and not on industry size; that it should be a decreasing function of the number of firms in the industry; and that it should have a range between zero and one.[5]

The most widely used measure is the four or eight firm concentration ratio. This measures the proportion of total industry sales, output, employment or assets held by the top four or eight firms in the industry.

The measure is weak, however, since it fails to be sensitive to the number of firms in the industry. Alternative measures include the Lorenz curve and Gini coefficient, the latter measures the degree of inequality of firms while the former graphs the percentage of total industry output, sales, etc., accounted for by numbers of firms. While these are useful descriptive measures, they contain two major disadvantages; the Gini coefficient provides paradoxical answers if only a few firms exist in the industry but are of equal size; and the Gini coefficient is quite sensitive to the definition of the number of firms in the industry. It would be preferable to have a measure which combines both the number and size distribution of firms. The best of a number of measures, and one which can be calculated relatively easily, is the Herfindahl index.

$$H = \sum_{i=1}^{n} S_i^2$$

where S_i is the i^{th} firms market share and n is the number of firms in the industry. H ranges in value from 0 (competition) to 1 (monopoly). If all firms within the industry are of equal size, H varies inversely with the number of firms while an increase in the degree of inequality of firm size will result in a rise in H. The H index plus a graph of the firm size distribution within the industry (the Lorenz curve) provide an excellent summary of information on market power. There are suggested rather than concentration ratios since these are merely points on the Lorenz curve. Furthermore, recent evidence shows that concentration ratios are generally a poor proxy for the Herfindahl index particularly in the case of highly concentrated industries.[6]

The first important factor in developing concentration measures for the television and radio industries is the definition of the market. Other studies, particularly in the United States, have treated the market as a national one. This is, we argue, not correct since the programming outputs of distant stations are not substitutable on either the demand or supply side. The relevant market is the signal shed; that area about urban areas in which consumers may substitute one signal for another. We therefore develop concentration measures of competition for sixteen market areas for both television and radio. Similarly, whereas the cable-television industry can be analysed on a national basis each firm has a monopoly position in its local market.

The measure of market share is the proportion of weekly viewing hours for a station within the signal shed. A second measure which we utilize is station revenue. Previous work has relied principally on revenue as the measure to evaluate shares. It is, however, incomplete and in some cases may be misleading. First, its use on a national basis understates concentration since the market is ill defined. Second, revenue variations result from both variations in advertising rates per minute and because of the number of viewers (expected); these are highly correlated since the advertising rate is a function of the number of viewers. A station may have substantial market power in a small urban area and showing lower revenue than a larger station in a larger urban area with a greater number of viewers and revenues although having a relatively lower proportion of the total market. Variation in market power results from the size of the market and this is not captured purely in a revenue measure and partic-

ularly with national concentration ratios. Finally, revenues will overstate concentration somewhat since import competition is not taken account of; the magnitude of this bias is not expected to be large. Audience share measures implicitly take account of import competing signals and are therefore a better measure.

Market areas defined by signal shed are the appropriate measure of plant concentration since it accounts for substitution possibilities on both the demand and supply sides. In the following chapter concentration measures on a market-by-market basis are developed for the television industry. Corresponding concentration measures for radio are discussed in chapter 8.

CHAPTER 2

FOOTNOTES

1. Canada, Canadian Radio Television and Telecommunications Commission, The Contemporary Status of Ownership and the Level of Concentration in the Canadian Broadcasting Industry, unpublished report prepared by Sunder Magun, Ownership Study Group, Ottawa: CRTC, 1977.

2. Ibid.

3. The Financial Post, May, 1976, p. S-4.

4. Joe S. Bain, Industrial Organization, New York: Wiley, 1968.

5. M. Hall and N. Tideman, "Measures of Concentration", Journal of the American Statistical Association, March, 1967.

6. R. Schmalensee, "Using the H index of Concentration with Published Data", Review of Economics and Statistics, Vol. 59, 1977, 186-193 and J. C. Hause, "The Measurement of Concentrated Industrial Structure and the Size Distribution of Firms", Annals of Economic and Social Measurement, Vol. 6, 1977, pp. 73-107.

3. PROFITABILITY AND RISK-RETURN IN TELEVISION AND RADIO

Aggregate data on revenues, expenses and operating profits in the television, radio, and cable television industries was presented in Chapter 1. The most significant of these in terms of industry performance measurement is profits. But data on aggregate dollar profits is relatively meaningless without some benchmark against which to evaluate it.

This chapter presents two approaches to the measurement of industry profit performance. In sections 3.1 and 3.2 weighted average rate of return measures are developed for corporations and groups in the television and radio industries respectively. These rates of return are then compared to corresponding measures for other non-broadcasting concerns. Because of the large number of cable television concerns it was not possible with the available resources to prepare a similar analysis of the cable television industry.

Section 3.3 introduces risk. A high return does not necessarily indicate superior economic performance from the viewpoint of a risk-average investor; the crucial question is whether the return of a company is higher or lower than appropriate for its level of risk. In section 3.3 we attempt to answer this question for six publicly quoted communications companies to see if profitability is unusually high when allowance is made for the risk element.

3.1 Rates of Return in the Television Industry

Various measures of rate of return are available and the choice of measure must be determined by the use to which it is being put. The measure of profits can be either before, or after, income taxes. Interest, which is after all, a payment for the services of

capital should somehow be taken into account. And the base over which the rate of return is to be calculated must be specified - should only shareholder's equity be considered or should long-term debt also be taken into account as part of the asset base upon which a return is being earned?

In the analysis of television in this section, and radio in the next, the following has been done. First, in general, the capital base upon which a return is being earned has been defined as the total of long term debt plus shareholder's equity. In certain cases, such as conglomerates, it was necessary to adjust the measured capital base to properly reflect only the broadcasting assets of a corporation since it would be clearly invalid to compute returns from broadcasting as a percentage of an overall asset base including significant non-broadcasting assets. In the case of radio, the presence of negative shareholders equity in the case of twelve radio corporations, for which data on broadcasting assets was lacking, required their elimination from all calculations.[1] A rate of return on a negative capital base is meaningless.

The measure of return chosen for use in calculating the results shown in tables 3.1 to 3.5 was the total of interest expense plus after tax profits. This measure, although of little value in assessing precisely the profitability of the industry, does show the magnitude of the return provided to all those supplying capital to television corporations regardless of whether this capital is extended on an ownership or debt basis. The rate of return of each corporation (or group, as the case may be) is weighted by the total

of long term debt plus equity, or broadcasting assets. according to whichever was used in the calculation of rate of return.

Evaluation of rates of return calculated in this fashion requires the reader to compare the calculated rate with corresponding rates of return in competitive industries. Such a rate should correspond to a "pure" rate of interest adjusted to reflect the riskiness of the investment. In the case of broadcasting such a calculation might use a "pure" interest rate of approximately 3 percent, an inflation premium of approximately 8 percent, and a risk premium of say 2 percent for a competitive brenchmark rate of return of approximately 13 percent. Overall returns on assets in excess of this rate would be indicative of super-normal profits attributable to positions of market, or monopoly, power.

Table 3.1 presents the weighted average rates of return on a profit plus interest basis for television corporations in 1975. Overall average weighted rate of return for all 59 television corporations is 32.2 percent. The groupings, by television revenue size class, show highest rates of return 39.6 percent to be earned by the corporations with the largest broadcasting asset base. The smallest corporations earned 19.0 percent with intermediate sizes lower still. All of these rates of return appear to be far in excess of those required to attract investment capital to the industry under competitive conditions in capital markets.

Certain group owners, for accounting convenience or other reasons, segregate individual broadcast undertakings in separate corporations. Using the group ownership information developed by the CRTC Ownership Study Group[2] it is possible to aggregate the results of these various entities and produce profit measures on a group basis.

The results of this procedure in the case of television are shown in table 3.2 where it will be observed that the rates of return for television groups is lower than that of the corresponding television corporations. On the surface this result appears anomalous since one normally thinks of the groups as being larger, economically stronger, and more profitable entities. What appears to be happening is that the very act of aggregating a group's broadcasting assets serves to bring into the picture other lower-yielding broadcasting assets which are excluded in the television corporation analysis. The only exception to this general finding is the increase in the television-radio group rate of return to 19.6 percent from the corresponding 18.6 percent figure for corporations.

It is possible to identify groups owning more than one television station (television-television group ownership) and corporations owning at least one radio station in addition to their television holdings (television-radio cross-ownership). It should be borne in mind, of course, that such classifications are not mutually exclusive - certain group owners may fall in both categories. However, when television groups are classified in this way, the results as shown in table 3.3 reveal television-television groups to be earning an overall weighted average rate of return to total capital of 45.2 percent. The corresponding figure for groups with television-radio cross-holdings is 19.5 percent.

TABLE 3.1

TELEVISION CORPORATIONS 1975
WEIGHTED AVERAGE RATE OF RETURN[1]

Revenue Size Class	No. of Corps.	Total Revenue (Thousands)	Weighted Average Rate of Return
4.5 millions & over	13	134861	0.396
1.8 - 4.5 millions	14	41519	0.133
1.0 - 1.8 millions	18	24423	0.157
Under 1.0 millions	14	8076	0.190
Overall	59	208879	0.322

[1]Profit plus interest on long term debt plus equity.

Source: Statistical Information Services, Department of Co-munications.

TABLE 3.2

TELEVISION GROUPS 1975
WEIGHTED AVERAGE RATE OF RETURN[1]

Revenue Size Class	No. of Groups	Total Revenue (Thousands)	Weighted Average Rate of Return
4.5 millions & over	14	159749	0.350
1.8 - 4.5 millions	10	30642	0.105
1.0 - 1.8 millions	9	11737	0.129
Under 1.0 millions	12	6751	0.190
Overall	45	208879	0.301

[1]Profit plus interest on long term debt plus equity

Source: Statistical Information Services, Department of Communications.

TABLE 3.3

TELEVISION GROUPS 1975
WEIGHTED AVERAGE RATE OF RETURN[1]

(Groups classified by type of cross-ownership)

Type of Cross-ownership	No. of Groups	Total Revenue (Thousands)	Weighted Average Rate of Return
Television-television	15	122,361	0.452
Television-radio	19	112,376	0.196

[1]Profit plus interest on long term debt plus equity.

Source: Statistical Information Services, Department of Communications.

3.2 Rates of Return in the Radio Industry

Table 3.4 shows the rates of return for radio corporations classified by Statistics Canada revenue size classes for radio. The overall rate of return for all 216 radio corporations is 18.1 percent. The highest rates of return occur in the case of the smallest (31.9 percent) and the largest (21.9 percent) corporations with no discernable trend evident in between - save for the second smallest size class (107 - 184 thousands of radio revenue) which earned zero profits on average.

When we turn to rates of return for radio groups, in table 3.5, we observe the converse of the situation noted in television. When the other, higher return, television holdings of radio group owners are brought into the picture, the weighted average rate of return for radio groups exceeds that for radio corporations - the overall rate rising from 18.1 percent to 18.8 percent. The pattern of rates over size classes is unaffected.

Examination of rates of return after classification by cross-ownership holdings of groups, see table 3.6, reveals some interesting differences from the television case. The radio-television group rate, of course, remains constant and equal to that of the identically defined television-radio group at 19.6 percent. But, whereas television-television groups achieved rates of interest plus profits return on total capital of 45.2 percent, radio-radio groups whether defined to include or exclude AM-FM combinations earned a rate of return identical to that of radio-television groups. The only significant variation occurred in the case of radio-newspaper chains which earned returns of 27.6 percent.

TABLE 3.4

RADIO CORPORATIONS 1975
WEIGHTED AVERAGE RATE OF RETURN[1]

Revenue Size Class	No. of Corps.	Total Revenue (Thousands)	Weighted Average Rate of Return
1.7 millions & over	31	104353	0.219
1.0 - 1.7 millions	20	25187	0.145
0.7 - 1.0 millions	24	19870	0.134
580 - 700 thousands	23	14620	0.152
434 - 580 thousands	25	12213	0.162
349 - 434 thousands	26	9889	0.099
273 - 349 thousands	24	7365	0.146
184 - 272 thousands	20	4414	0.181
107 - 184 thousands	14	2051	0.004
Under 107 thousands	9	382	0.318
Overall	216	200344	0.181

[1]Profit plus interest on long term debt plus equity.

Source: Statistical Information Services, Department of Communications.

RADIO GROUPS 1975
WEIGHTED AVERAGE RATE OF RETURN[1]

Revenue Size Class	No. of Groups	Total Revenue (Thousands)	Weighted Average Rate of Return
1.7 millions & over	27	137789	0.196
1.0 - 1.7 millions	13	16147	0.222
0.7 - 1.0 millions	17	13915	0.126
580 - 700 thousands	15	9518	0.181
434 - 580 thousands	13	6354	0.210
349 - 434 thousands	21	8033	0.133
273 - 349 thousands	15	4577	0.152
184 - 273 thousands	15	3371	0.187
107 - 184 thousands	11	1613	0.023
Under 107 thousands	6	181	0.356
Overall	153	201498	0.188

[1]Profit plus interest on long term debt plus equity.

Source: Statistical Information Services, Department of Communications.

TABLE 3.6

RADIO GROUPS 1975
WEIGHTED AVERAGE RATE OF RETURN[1]

(Groups classified by type of cross-ownership)

Type of Cross-ownership	No. of Groups	Total Rev. (Thousands)	Weighted Average Rate of Return
Radio-radio (including AM-FM's)	75	147,705	0.196
Radio-radio (excluding AM-FM's)	52	141,273	0.193
Radio-newspaper	6	16,696	0.276
Radio-television	19	66,408	0.196

[1]Profit plus interest on long term debt plus equity.

Source: Statistical Information Services, Department of Communications.

3.3 Reward-Per-Unit of Risk: An Alternative Approach to Evaluating the Economic Performance of Broadcasting Companies

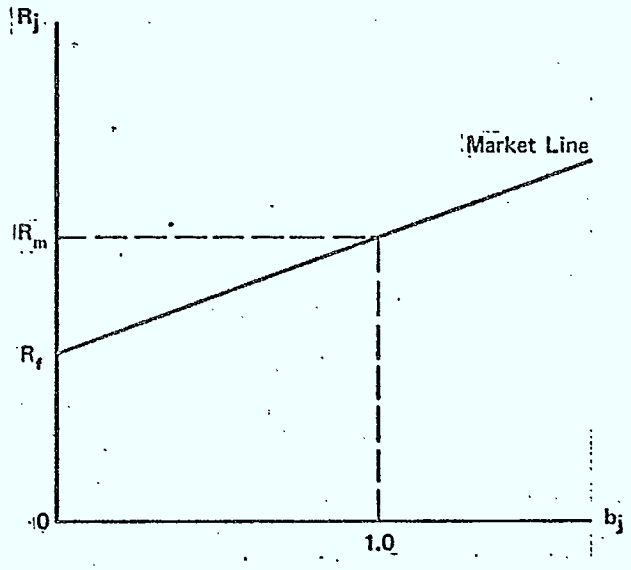
The above analysis did not consider risk. It is generally accepted, however, that investors are risk averse. Hence, if there are two companies, one with a higher return and greater risk than the other, it is possible that investors will prefer the performance of the lower return/less risk company: an entire industry, the insurance industry, is indeed based on many people choosing lower return/lower risk options. A high return, therefore, does not necessarily indicate superior economic performance from the viewpoint of investors; the crucial question is whether the return of a company is higher or lower than appropriate for its level of risk. In this section we attempt to answer this question for six publicly quoted communications companies to see if our earlier contention, that profitability is unusually high, is still supported when we allow for the risk element.

3.3.1 Model Specification

Companies in the private sector are run in the interests of shareholders. Shareholders of a broadcasting company, or any other company, should expect a rate of return equal to that available from other investments with the same risk. If that return is not forthcoming, investors will sell shares causing a decrease in stock price until the return rises to the level appropriate for the risk and equilibrium is established. The Capital Asset Pricing Model (C.A.P.M.) demonstrates that for diversified investors, the relevant risk associated with a security is the systematic risk, beta (b), attributable to factors which simultaneously affect the prices of all marketable securities. Diversification virtually eliminates the unsystematic, non-market related, risk and hence this type of risk

should not command a risk premium. A risk premium will be demanded, however, for the systematic risk because this cannot be reduced by diversification. Hence, assuming efficient capital markets, a return - systematic risk trade-off is established by the market.[3] Where R_j is the return on security j or portfolio j, R_f is the risk-free rate of return, and b_j is the systematic risk of security j or portfolio j, the return-risk trade-off is illustrated in Figure 3.1.:

Figure 3.1 The Market Return — Risk Line



The market portfolio, with return R_m, by definition has a beta value of 1.00 and will lie on this Market Line. In equilibrium the return - risk combination of individual stocks and individual portfolios would also be expected to lie on this line. On an ex-post basis, therefore, the expected return on the stock of company j, $E(R_j)$, is given by:

$$E(R_j) = \bar{R}_f + (\bar{R}_m - \bar{R}_p)\, b_j \qquad (1)$$

where b_j is actual realized systematic risk of company j, $\bar{R}_f$ is the actual realized average risk-free rate of return, and $\bar{R}_m$ is the actual realized average market rate of return. The value of b_j can be obtained using the regression equation for the characteristic line:

$$R_{jt} = a_j + b_j R_{mt} + e_{jt} \qquad (2)$$

where R_{mt} is the return on the market in period t, e_{jt} is the error term attributable to unsystematic risk, and R_{jt} is the return on stock j in period t and equals the ratio of the capital gain plus the dividend in the period to the stock price in the previous period:

$$R_{jt} = (P_{jt} - P_{jt-1} + D_{jt})/P_{jt-1}$$

where P_{jt} is price of stock j in period t, P_{jt-1} is the price of stock j in period t - 1, and D_{jt} is the cash dividend per share during period t.

The concept of $E(R_j)$ as the return that should be expected by shareholders has been advocated and used in some public utility rate regulation cases.[4] For our purposes what we are concerned with is whether the actual realized average rate of return on stock j, $\bar{R}_j$, is greater than $E(R_j)$ in which case its return-risk combination is above the Market Line and it is outperforming the market, or is less than $E(R_j)$ which would indicate an inferior performance. $\bar{R}_j$ is calculated as follows:

$$\bar{R}_j = \sum_{t=1}^{n} R_{jt}/n$$

where n is the number of periods.

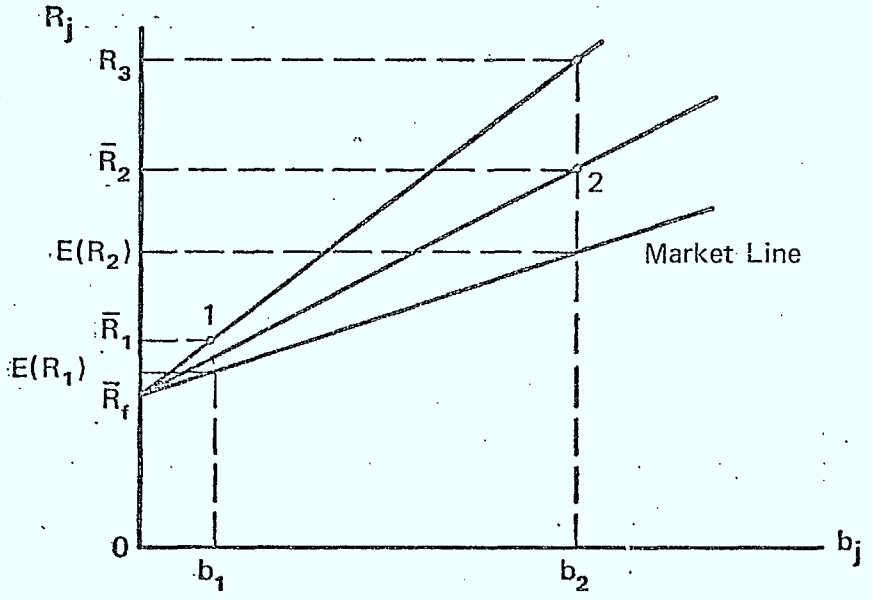
Another method of determining whether the return-risk combination for a broadcasting company is above or below the Market Line is to calculate Treynor's reward-to-volatility or reward-per-unit of risk ratio[5] and compare it to the ratio for the market portfolio. The Treynor Ratio, T_j for company j, is calculated as the ratio of the mean excess return to beta:

$$T_j = \frac{\bar{R}_j - \bar{R}_f}{b_j}$$

If the ratio for company j is greater than for the market portfolio, then the company has outperformed the market. The advantage of the Treynor Ratio is that it not only indicates whether a stock has outperformed the market but also allows us to rank the performance of different stocks.

As a result the Treynor Ratio has been employed extensively in the academic literature to evaluate performance, usually of mutual funds, and indirectly as a test of capital market theory.[6] The comparison of $\bar{R}_j$ and $E(R_j)$, even in the form $\bar{R}_j - E(R_j)$, on the other hand does not permit an assessment of the relative performance of stocks all of which have outperformed (or under-performed) the market. This is illustrated in Figure 3.2.:

Figure 3.2 Measurements of Performance



In Figure 3.2.1.2 we have stocks 1 and 2 with realized returns of $\bar{R}_1$ and $\bar{R}_2$ respectively and realized systematic risk of b_1 and b_2 respectively. The Treynor Ratio for stock 1, T_1, is the slope of the line drawn from $\bar{R}_f$ through the return-risk combination of stock 1. $T_1 > T_2$ although $\bar{R}_1 - E(R_1) < \bar{R}_2 - E(R_2)$. The Treynor Ratio thus indicates that the performance of stock 1 is superior. This assessment is correct because by borrowing at $\bar{R}_f$ and investing the additional money in stock 1, it would be possible to achieve return $\bar{R}_3$, where $\bar{R}_3 > \bar{R}_2$, for systematic risk b_2.

In Section 3.4, in order to evaluate the performance of the six broadcasting stocks, we will thus calculate the Treynor Ratio for each stock

as well as comparing the actual realized average rate of return with that expected in the CAPM.

3.3.2 The Data

The data sources used to obtain R_{jt}, necessary to estimate b_j and compute $\bar{R}_j$, were the Financial Post Tape of Stock Prices, this gives weekly closing prices and these had to be converted by hand to monthly closing prices, and the Financial Post Cards from which dividend data was extracted by hand. Where necessary the prices were adjusted for stock splits. In Canada the best proxy for the market portfolio is the TSE 300 and for the risk-free rate is the Canadian Treasury yields. The TSE and Canadian Treasury Yields, Series 1, tape was the source used for the monthly value of the TSE 300 while annual Canadian Treasury yields were obtained from the Series 2 tape and converted to monthly rates.

To estimate the systematic risk, b_j, from the regression of the characteristic line it was decided to use monthly data for three over-lapping six year periods between 1967 and 1974; the latter being the last year for which the stock price data is available on tape. A six year period was chosen as a good compromise between conflicting estimating problems; the longer the period the greater the possibility of shifts in the b value over time whereas the shorter the period the greater the influence of random fluctuations. The companies for which estimates could be made were thus restricted to those broadcasting companies with publicly traded shares for which stock price data was available from 1967 to 1974 on the Financial Post Tapes. Such data was available for Canadian Cablesystems, IWC Communications, MacLean-Hunter, Selkirk Holdings, Standard Broadcasting, and Western Broadcasting. The nature and interests of these companies were described in Chapter two. Some of the companies are not confined to broadcasting operations and it is not possible to separate the performance

of their broadcasting operations from their total activities. Even for a company like MacLean-Hunter with substantial non-broadcasting operations, however, The Financial Post[5] indicates that broadcasting operations contribute more than 50% of profits.

3.3 The Results

The regression results show that the returns for each broadcasting company, for each six year overlapping period, were significantly related to the TSE 300's return with all estimates of b_j being more than two-and a-half times greater than their standard errors. In each case the F test indicated the relationship to be significant at the 5% level. The R^2 values were around .20 indicating that about 20% of the variation in returns on stocks was explained by the TSE 300 return.

Table 3.2.3.1 shows the value of b_j, $\bar{R}_j$, $E(R_j)$ and T_j for each company and for the TSE 300 for the period 1957-72. $\bar{R}_j$ and $E(R_j)$, in this and subsequent Tables, are monthly rates for return. The monthly Canadian Treasury yield for this period was .004235 and this value was used in the calculation of $E(R_j)$ and T_j. Four of the companies have $b < 1.00$ which indicates a lower systematic risk than the market portfolio while two companies have $b > 1.00$.

Table 3.7: PERFORMANCE OF BROADCASTING COMPANIES 1967-72

Stock Code	Stock Name	b_j	R_j	$E(R_j)$	T_j
1	Canadian Cable Systems Ltd.	0.7377496	0.015935	0.0058691	0.01585904
2	IWC Communications Ltd.	1.682982	0.009182	0.0079628	0.00293942
3	MacLean-Hunter Ltd. 'A'	1.180053	0.023569	0.0068488	0.01638401
4	Selkirk Holdings Ltd. 'A'	0.8409220	0.020826	0.0060976	0.01972953
5	Standard Broadcasting Corp.	0.7626957	0.019964	0.0059243	0.02062290
6	Western Broadcasting Co. 'ACV'	0.8109327	0.033695	0.0060312	0.03632854
7	TSE 300	1.00	0.006450	0.006450	0.002215

It can be seen that for each company $\bar{R}_j > E(R_j)$ indicating that actual realized average return was greater than that expected according to the CAPM. The fact that the stock of each company outperformed the market is also shown by a T_j value greater than .002215, the value of the Treynor Ratio for the TSE 300. The company with the best economic performance in the period, indicated by the highest Treynor Ratio, was Western Broadcasting. The results are illustrated in Figure 3.3.

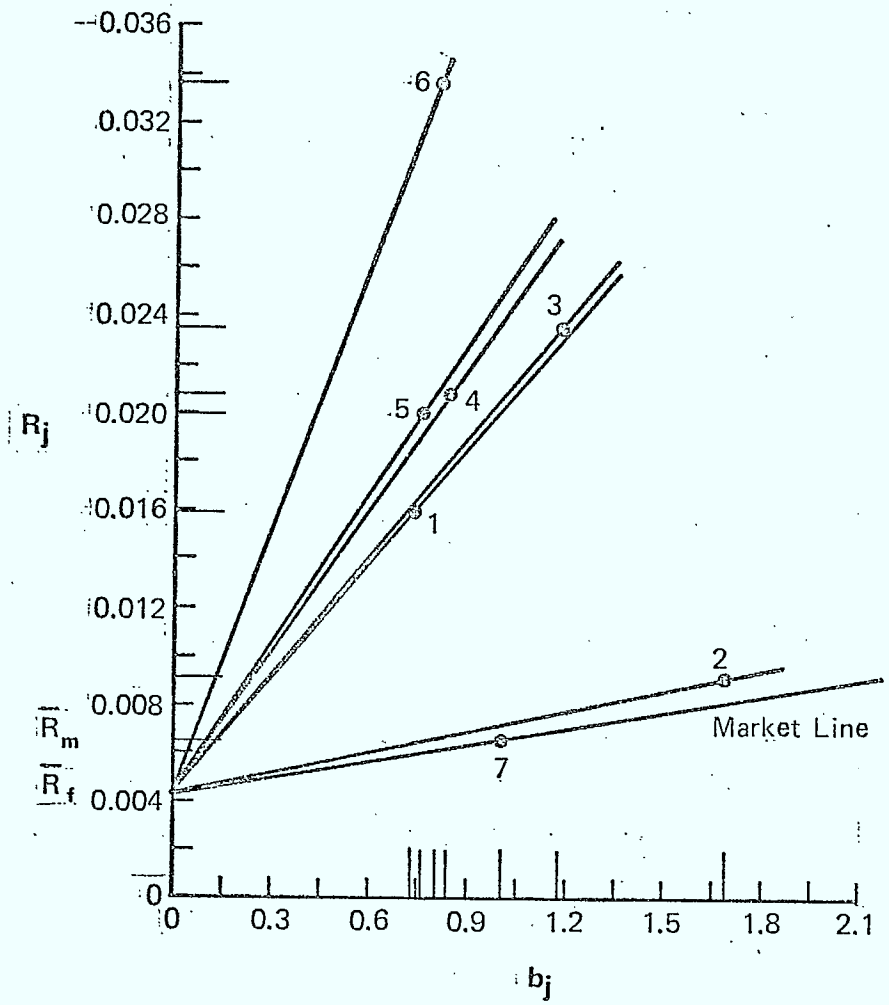
The return-risk combination of the stock is shown using the stock number coding given in Table 3.7. The slopes of the lines drawn from R_f through these numbers are the Treynor Ratios. Although not shown, to avoid cluttering the graph, the value of $E(R_j)$ is the vertical distance at b_j between the horizontal axis and the market line.

Table 3.8. shows the results for the period 1968 - 1973 during which $\bar{R}_f = .004345$. Five companies have $\bar{R}_j > E(R_j)$ and $T_j > .000350$, the Treynor Ratio for the TSE 300, and hence have a higher return than expected and a better reward-per-unit of risk performance than the market. IWC Communications is the exception with an inferior performance.

Table 3.8: PERFORMANCE OF BROADCASTING COMPANIES 1968-73

Stock$_j$	b_j	$\bar{R}_j$	$E(R_j)$	T_j
Canadian Cable Systems Ltd.	0.8485235	0.009951	0.00464198	0.00660677
IWC Communications Ltd.	1.646998	-0.000465	0.00492145	-0.00292046
MacLean-Hunter Ltd. 'A'	1.076886	0.005885	0.00472191	0.00143005
Selkirk Holdings Ltd. 'A'	0.8787144	0.008948	0.00465255	0.00523833
Standard Broadcasting Corp.	0.7719583	0.007745	0.00461519	0.00440438
Western Broadcasting Co. 'ACV'	0.9458769	0.016807	0.00467606	0.01317510
TSE 300	1.00	0.004695	0.004695	0.000350

Figure 3.3 Illustration of Return-Risk Performance of Broadcasting Companies 1967-1972



For the period 1969-1974, during which $\bar{R}_f$ = .004551, the results in Table 3.9 show that four companies outperformed the market with $\bar{R}_j > E(R_j)$ and T_j greater than that of the TSE 300. IWC Communications again turned in an inferior performance as did, in this period only, Canadian Cable Systems.

Table 3.9: PERFORMANCE OF BROADCASTING COMPANIES 1969-74

$Stock_j$	b_j	$\bar{R}_j$	$E(R_j)$	T_j
Canadian Cable Systems Ltd.	1.010303	-0.002166	-0.00160276	-0.00664850
IWC Communications Ltd.	1.476478	-0.008907	-0.00444223	-0.00911493
MacLean-Hunter Ltd. 'A'	1.066969	-0.000516	-0.001947791	-0.00474847
Selkirk Holdings Ltd. 'A'	0.8423210	0.007882	-0.00057958	0.0039545
Standard Broadcasting Corp.	0.8529338	0.000269	-0.00064422	0.0050203
Western Broadcasting Co. 'ACV'	1.075531	0.007202	-0.00200006	0.0024648
TSE 300	1.00	-0.001540		-0.006091

3.2.4. Summary and Conclusion

The beta values for the six companies indicate that they are not on average riskier than the market and the Treynor Ratios indicate that these companies on balance outperformed the market. MacLean-Hunter, Selkirk Holdings, Standard Broadcasting, and Western Broadcasting outperformed the market, in many cases very substantially, in each of the three periods. Canadian Cable Systems outperformed the market in two periods and was marginally inferior in one period while IWC Communications outperformed the market in one period and was inferior to the market performance in two periods. The overall results, although for a limited number of companies, tend to support the view that broadcasting companies are unusually

profitable. As noted earlier, some of these companies do have non-broadcasting operations: this would only cause problems to our conclusion if there were evidence that their non-broadcasting operations performed better than their broadcasting operations. As we noted earlier, The Financial Post suggests that for MacLean-Hunter the opposite is true.

Chapter 3 - Footnotes

1. Data on broadcasting assets of these firms was not available. The twelve accounted for approximately $1 million in negative shareholder's equity, $270 thousand dollars in interest expense, and zero profits.

2. CRTC, Ownership Study Group, op. cit..

3. See M. C. Findlay and A. A. Darran, "A Free Lunch on the Toronto Stock Exchange," Journal of Business Administration, Volume 6, No. 2, Spring 1978, pp. 31-40, for evidence that suggests the TSE is not as efficient as the NYSE.

4. The relevance of the CAPM to rate regulation has been discussed by S.C. Myers, "The Application of Finance Theory to Public Utility Rate Cases," The Bell Journal of Economics and Management Science, Spring 1972, pp. 52-97; D. A. West and A. A. Ewbank, "An Automatic Cost Adjustment Model for Regulating Public Utilities," Financial Management, Vol. 5, No. 1, Spring 1976, pp. 23-31: R. L. Hagerman, "Finance Theory in Rate Hearings," Financial Management, Vol. 5, No. 1, Spring 1976, pp. 18-22; and E. F. Brigham and R. L. Crum, "On the Use of the CAPM in Public Utility Rate Cases," Financial Management, Vol. 6, No. 2, Summer 1977, pp. 7-15.

5. J. L. Treynor, "How to Rate Management of Investment Funds," Harvard Business Review, January-February, 1965, pp. 63-75.

6. See for example, J. G. McDonald, "Objectives and Performance of Mutual Funds," Journal of Finance and Quantitative Analysis, June 1974, pp. 311-333; and W. F. Sharpe & O. M. Cooper, "Risk - Return Classes of New York Stock Exchange Common Stocks, 1931-67," Financial Analysts Journal, March-April 1972, pp. 46.

7. The Financial Post, "Special Report on the Media," November 19, 1977.

4. Television Markets

Before examining television markets some consideration is warranted concerning whether it is appropriate to distinguish between a television broadcasting industry and a radio broadcasting industry or whether both should be regarded, for purposes of analysis, as part of a media industry which would also include newspapers. The argument for regarding them as part of a media industry is that television, radio and newspapers all sell essentially the same product, namely audience/readership exposure to advertising messages. They are thus competing for advertising revenue. As Levin has noted[1], however, the different media are also partly complementary in the sense that each of the media is best suited to a particular type of advertising message. Radio is more effective than newspapers for bringing brand names and a few important characteristics of a product to the attention of consumers. Television is considered the most effective all round advertising medium but is still inferior to newspapers for providing information of any depth. Another complementary aspect is that radio and newspapers carry primarily local advertising whereas television also has substantial national advertising. Thus advertising campaigns often involve the purchase of time/space in each of the three media.

As the different media are partly complementary as well as partly competitive, we feel justified in adopting the usual approach of analyzing television broadcasting and radio bradcasting separately. In our discussion of the individual markets, however, we will note any cross-ownership among the different media within the same market as this presumably reduces competition for the advertising dollar.[2]

In Chapter 2 we argued that the relevant market is defined by the signal shed. A Census Metropolitan Area (C.M.A.) provides a reasonable approximation of a signal shed and is a convenient choice because BBM audience data is available. When selecting markets it was decided to include all C.M.A.'s in Canada with populations of over 200,000 plus, to improve regional representation, St. Johns and Regina. This gave the following markets: St. John's, Halifax, Quebec City, Montreal, Ottawa-Hull, Toronto, Hamilton, Kitchener, London, Windsor, Winnipeg, Regina, Edmonton, Calgary, Vancouver, and Victoria. For reasons that will be explained later, it was decided to omit Hamilton and Victoria as television markets but not as radio markets.

In order to measure concentration, using the Herfindhal Index discussed in Chapter 2, the stations in the market must be identified. Broadcasting is unusual in the sense that some stations, often available by cable only, that are not competing for advertising revenue in a market are nevertheless competing for audience, and hence presumably affect the advertising rates and revenues in the market. Thus a station that sells time to advertisers in a market has two types of competitor; stations that are direct competitors for advertising revenue and stations that are competing for audience only. Hence identification of stations competing in a television market involves identification of those firms that are competing for advertising revenue and identification of those firms that are competing for audience. The latter will include both the stations that compete for revenue and the additional stations which obtain a significant audience share. To reflect the two levels of competition it is necessary

to measure concentration in terms of both revenue and audience and this is done with a Revenue Herfindhal Index calculated as the sum of squared revenue shares and an Audience Herfindhal Index calculated as the sum of the squared audience shares.

4.1 Identification of Stations Competing for Revenue

The following criteria were adopted for determining whether a station is a revenue competitor in a market. Subject to the provisos that the station sells advertising time and accounts for 1% or more of the Total Hours Tuned (All persons 2+, Monday through Sunday) in the Market C.M.A.[3], the station is included if:

(a) It is located in the C.M.A.[4]

or (b) It is located outside the C.M.A. but within Canada and

(i) Over 50% of the Total Hours Tuned (All persons 2+, Monday through Sunday) to the station are in the C.M.A.[5]

or (ii) The C.M.A. is the single target market (in terms of total hours tuned) for the station and 20% to 50% of the Total Hours Tuned (All persons 2+, Monday through Sunday) to the station are from the C.M.A.

The effect of the provisos are to exclude CICA, Toronto, because it does not advertise and to exclude C.B.C. French Stations in Toronto, Winnipeg, and Edmonton because they have an audience share of less than 1%. The stipulation, in criterion (b), that the station be located inside Canada probably results in the exclusion of a few U.S. stations, for example, KVOS (Bellingham), which would otherwise

qualify. The reason for the stipulation is that the Department of Communications (DOC) does not have revenue information for U.S. stations and hence it would be impossible to compute their revenue share or include them in the calaculation of the Herfindhal Index based on revenue.

The reasons for choosing criteria (a) and (b)(i) are self evident; most of the advertising messages on stations which qualify under these criteria are obviously aimed at the C.M.A. market. It was thought, however, that on their own these criteria were too restrictive. They would exclude, for example, a station with 49% of its audience in the C.M.A., 11% in another C.M.A., and the remaining 40% evenly divided between eight other markets. Obviously most of the advertising on such a station would be targeted at the C.M.A. To permit inclusion of such stations it was decided that a station should be included if the C.M.A. is its largest single market and if at least 20% of its Total Hours Tuned are from the C.M.A. The 20% figure is obviously arbitrary but some lower limit is necessary to exclude stations whose audience is spread so thinly that it would be unreasonable to suppose that most of the advertising messages carried are aimed at one particular C.M.A.

In the application of these criteria, problems were encountered because of overlap between the Toronto and Hamilton markets, and the Vancouver and Victoria markets. DOC identify CHCH as the sole station located in Hamilton. Hence, including Hamilton C.M.A. as a separate market would entail, under criterion (a), allocating CHCH to this market. However, 52.3% of the audience (Total Hours Tuned) of CHCH is accounted for by Toronto C.M.A. and only 14.6% by Hamilton C.M.A.; presumably its audience in Toronto C.M.A. is responsible for

considerably more advertising revenue than its audience in Hamilton C.M.A. It was thus decided that it would be misleading to retain Hamilton C.M.A. as a separate market. One possible treatment would be to redefine the market as Toronto C.M.A./Hamilton C.M.A. For CHCH, and CBLT, this alternative would make a lot of sense as Hamilton C.M.A. is the second largest audience market for these stations. It is obvious though that CITY, with only 0.5% of its audience in Hamilton C.M.A., is not aimed at the Hamilton market. With this in mind, and also considering that all the other stations, including CHCH, have less than 15% of their audience in Hamilton, it was decided instead to omit Hamilton C.M.A. as a television market. With Hamilton C.M.A. omitted, CHCH qualifies, under criterion (b)(i), as a revenue station in the Toronto C.M.A. market.

CHEK, the sole station located in Victoria C.M.A., is a similar case to CHCH. It seemed undesirable to retain Victoria C.M.A. as a separate market because only 22% of CHEK's audience is from Victoria C.M.A. compared with 48% from Vancouver C.M.A. Redefining the market as Vancouver C.M.A./Victoria C.M.A. was rejected because Victoria is not an important market for the Vancouver stations: for CBUT it comprises 9.2% of its audience while for CHAN it is only 4.3%. For CHAN it is a less important market than either Kamloops C.M.A. or Prince George C.M.A. Thus it was decided to omit Victoria C.M.A. as a television market in the study. This permitted CHEK to qualify as a revenue station, under criterion (b)(ii), in the Vancouver C.M.A. market.

The only other problem encountered in assigning stations was the treatment of GKGN (Global). In essence the Global network is a

single station, with production centered in Toronto, which has a number of re-broadcast facilities. As it reports as a single entity to DOC, its revenues are not sub-divided by re-broadcast facility. Hence, employing criterion (b)(ii), it was decided to include Global in its largest single market, Toronto C.M.A. The only other treatment possible would have been to pro-rate the revenue according to the Global audience in the different markets, i.e., Toronto, 30.6%, Ottawa-Hull, 15.8%, London, 4.2%, Kitchener, 3.9%, Windsor, .75%.

The stations assigned to the television markets as revenue competitors are shown in Tables 4.2 to 4.15. For convenience these Tables appear at the end of this Chapter and are ordered from East to West. With the exception of cases already discussed, all the stations are located within the C.M.A. of the market to which they are assigned. The above Tables also include the name of the group, if any, to which each station belongs and the nature of the group, using the abbreviations and definitions provided in the Footnote to Table 4.2. The Revenue Herfindhal Index for the market in question is shown at the top of each of these Tables. To permit easier inter-market comparisons of Revenue Herfindhal Indices, they are also listed by market in Table 4.1. To maintain confidentiality the Revenue Herfindhal Index for each market was calculated by DOC staff. For this reason, the revenue share of each station is not shown by the authors and cannot be reported in the Tables.

An upward bias exists in the Revenue Herfindhal Index calculated for some markets because the calculation excluded revenue from advertising aimed at the market from television stations not

TABLE 4.1 HERFINDHAL INDICES BY MARKET

Market C.M.A.	Revenue Herfindhal Index	Audience Herfindhal Index
St. John's	.595	.511
Halifax	.621	.390
Quebec	.637	.349
Montreal	.392	.296
Ottawa-Hull	.498	.208
Toronto	.272	.133
Kitchener	1.00	.152
London	1.00	.184
Windsor	1.00	.200
Winnipeg	.523	.255
Regina	.735	.615
Edmonton	.390	.275
Calgary	.535	.329
Vancouver	.625	.188

assigned to the market. Thus some of C.K.G.N.'s advertising revenue will come from advertising aimed at Ottawa-Hull but it will not be reflected by the Revenue Herfindhal for that market. Canadian advertising on U.S. stations comes under the same category. It is believed that approximately $20-$22 million in advertising was spent by Canadians on U.S. television and radio stations in 1974 with about 75% of this spent in Buffalo (aimed primarily at Toronto) and Bellingham (aimed at Vancouver).[6]

4.2 Identification of Stations Competing for Audience

The criterion used to identify competitors for audience in a market was to include all stations which account for 1% or more of the Total Hours Tuned (All persons 2+, Monday through Sunday) as identified from BBM data.

A side effect of the 1% rule is that Vancouver is the only market that includes a P.B.S. station as an audience competitor. The additional audience competitors, additional to the revenue competitors who will also be audience competitors, are listed for each market in Tables 14.2 to 14.15. The audience share[7] of each station is also shown and the Audience Herfindhal Index indicated at the top of the table. To permit easier inter-market comparisons and also comparison with the Revenue Herfindhal Index for the same market, the Audience Herfindhal Indices are also listed by market in Table 4.1

4.3 Competition and Concentration in the Markets

An examination of the individual markets reveals that certain markets have similar characteristics. St. John's (Table 4.2) and Regina (Table 4.12) are isolated markets that are not served by cable. As such they are the only markets with no additional audience competitors.

With two revenue and two audience competitors the Herfindhal Indices based on both revenue and audience indicate a high level of concentration. Regina actually exhibits a higher revenue and a higher audience concentration than any of our other markets. In addition, there is cross-ownership in both markets. In St. Johns the Stirling Group owns both CJON-TV and CJON-AM. In Regina, the Armdale Group includes CKCK-TV and CKCK-AM as well as The Leader Post newspaper. It is interesting to note that in both St. Johns and Regina the Revenue Herfindhal Index is greater than the Audience Herfindhal Index. This indicates that the market power in terms of revenue of CJON-TV in St. John's and CKCK-TV in Regina is greater than their audience share would suggest.

Kitchener (Table 4.8), London (Table 4.9), and Windsor (Table 4.10) each have a Revenue Herfindhal Index of 1.00. because there is only one revenue station in the market, but have a low Audience Herfindhal Index reflecting substantial audience competition both from Canadian and U.S. stations. The U.S. networks, in fact, actually regard Windsor as part of the Detroit market. These are the prime examples or markets where the Revenue Herfindhal Index alone would give a misleading impression. The London market exhibits an interesting case of cross-ownership. The W.J. Blackburn Group owns CFPL-TV, CFPL-AM, CFPL-FM and the London Free Press newspaper. Obviously its control of the advertising outlets in the area is very substantial.

Montreal (Table 4.5), Ottawa-Hull (Table 4.6), and to a lesser extent Quebec (Table 4.4), are markets where a significant portion of the audience watch television stations which broadcast in the minority language for that market. It can be argued that all the stations in

the market are not really competitors; a television station broadcasting in French is not competing with a television station broadcasting in English for advertising messages targeted at unilingual Anglophones. As a result there is likely to be a downward bias in the Herfindhal Indices reported for these markets. Quebec, where such a bias would be least, is the only market which exhibits cross-ownership with the Tele-Capitale Group controlling CFCM-TV, CHRC-AM and CHRC-FM. CBC has two revenue stations in both Montreal and Ottawa-Hull. As such it is a multi-plant operation within the same market and, for purposes of calculating the Herfindhal Indices, the market share of the Corporation as a whole is used.

Vancouver is the only market where a private group owns more than one television station. The Western Group includes CHAN-TV and CHEK-TV as well as radio stations CKNW-AM and CFMI-FM. Consistent with our treatment of CBC in the Montreal and Ottawa-Hull markets, the market shares of CHAN-TV and CHEK-TV are combined for purposes of calculating the Herfindhal Indices. With the Western Group having only one revenue competitor, CBUT, the Revenue Herfindhal Index is high. As indicated earlier, however, this figure is biased upwards because the effect of KVOS (Bellingham) as a revenue competitor is ignored. The substantial audience competition from U.S. stations results in a low Audience Herfindhal Index.

Toronto is the least concentrated market with the lowest Revenue Herfindhal Index and the lowest Audience Herfindhal Index. This is despite an upward bias in the Revenue Herfindhal Index because substantial revenue competition from Buffalo stations is not accounted for.

Of the other markets, Edmonton with a third independent station, CITV, has the lowest revenue concentration, while Winnipeg, with four additional audience competitors as compared to one for Edmonton, has the lowest audience concentration. Calgary, with two revenue competitors and two additional audience competitors, has a somewhat higher Revenue Herfindhal Index and Audience Herfindhal Index than the other two markets. Substantial cross-ownership exists in Calgary where the Southam-Selkirk Group owns CFAC-TV, CFAC-AM, and The Calgary Herald newspaper. In Winnipeg, the Moffat Group control CKY-TV, CKY-AM and CKY-FM.

Footnotes - Chapter 4

1. Levin, H.J. Broadcast Regulation and Joint Ownership of Media, New York: New York University Press, 1960.

2. The possible effects of cross-ownership in the same market are examined in more detail in Chapter 6.

3. Identified from BBM Television Circulation Report by Area, BBM Coverage and Circulation Report: Television, October 28 - November 10, 1974.

   This is also the source for all subsequent Market C.M.A. audience figures employed in this Chapter.

4. As identified by Department of Communications files.

5. Identified from BBM Television Station Coverage Report, BBM Coverage and Circulation Report: Television, October 28- November 10, 1974.

   This is also the source for all subsequent breakdowns in this Chapter of audiences for individual stations.

6. Turetsky, Howard B. Broadcasters: Canada Versus the United States, (April 17, 1975): Report prepared by Faulkner, Dawtains and Sullivan for Department of Communications.

7. The audience share of a station is the Total Hours Tuned (All persons 2+, Monday through Sunday) to the station in the C.M.A. divided by the Total Hours Tuned to All Stations in the C.M.A.

TABLE 4.2 TELEVISION MARKET: St. John's CMA

MARKET HERFINDHAL INDICES: REVENUE = .595, AUDIENCE = .511

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CJON		STIRLING	TT-RR-TR	.574
2	CBNT		CBC		.426

Footnote 1:

The abbreviations used to denote the nature of a group are as follows:

TT denotes a group with more than one television station.

TR denotes a group with at least one television station and at least one radio station.

RR denotes a group with more than one radio station, (includes AM plus FM).

N denotes a group which includes at least one newspaper as well as at least one television or radio station.

2

TABLE 4.3 TELEVISION MARKET: Halifax CMA

MARKET HERFINDHAL INDICES: REVENUE = .621, AUDIENCE = .390

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CJCH		CHUM	TT-TR-RR	.544
2	CBHT		CBC		.283
3		WEMT			.091
4		WLBZ			.068

TABLE 4.4 TELEVISION MARKET: Quebec CMA

MARKET HERFINDHAL INDICES: REVENUE = .637, AUDIENCE = .349

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CFCM		TÉLÉ-CAPITALE	TR-RR	.439
2	CBVT		CBC		.390
3	CKMI				.049
4		CFTM	TÉLÉ-METROPOLE	TT	.065
5		WMTW			.012
6		CKTM	H. AUDET	TT	.011
7		WCAX			.012

TABLE 4.5 TELEVISION MARKET: Montreal CMA

MARKET HERFINDHAL INDICES: REVENUE = .392, AUDIENCE = .296

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CFTM		TÉLÉ-METROPOLE	TT	.378
2	CBFT		CBC		).346
3	CBMT		CBC		)
4	CFCF		SEPT-ILES	TR-RR	.179
5		WCAX			.035
6		WPTZ			.023
7		WMTW			.016

TABLE 4.6 TELEVISION MARKET: Ottawa-Hull CMA

MARKET HERFINDHAL INDICES: REVENUE = .498, AUDIENCE = .208

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CJOH		STANDARD		.241
2	CBOT		CBC		)
3	CBOFT				) .327
4	CFVO				.051
5		WWNY CBS			.144
6		CKGN ?			.135
7		CFTM	TÉLÉ-METROPOLE	TT	.024
8		WPTZ (NBC)			.022
9		CFCF (Montreal CTV)	SEPT-ILES	TR-RR	.017
10		CKWS (Kingston)	THOMSON-DAVIES	TT-TR-RR	.019

PBS ?
TV Ontario ?
Pembroke ?
Kingston ?
Global ?

20
10
30

TABLE 4.7 TELEVISION MARKET: Toronto CMA

MARKET HERFINDHAL INDICES: REVENUE = .272, AUDIENCE = .133

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CFTO		BATON	TT-TR-RR	.202
2	CBLT		CBC		.181
3	CITY				.035
4	CHCH		SOUTHAM-SELKIRK	N-TT-TR-RR	.148
5	CKGN				.062
6		CICA			.010
7		WKBW			.120
8		WBEN			.098
9		WGR			.086
10		WUTV			.016
11		CKVR	CHUM	TT-TR-RR	.019

30
11
/41

TABLE 4.8 TELEVISION MARKET: Kitchener CMA

MARKET HERFINDHAL INDICES: REVENUE = 1.00, AUDIENCE = .152

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CKCO		ELECTROHOME	TR-RR	.277
2		WKBW			.111
3		CHCH	SOUTHAM-SELKIRK	N-TT-TR-RR	.153
4		WBEN			.101
5		CFPL	BLACKBURN	N-TT-TR-RR	.109
6		WGR			.085
7		CKGN			.094
8		CBLT	CBC		.026
9		CFTO	BATON	TT-TR-RR	.016

TABLE 4.9 TELEVISION MARKET: London CMA

MARKET HERFINDHAL INDICES: REVENUE = 1.00, AUDIENCE = .184

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CFPL		BLACKBURN	N-TT-TR-RR	.359
2		CKCO	ELECTROHOME	RR-TR	.150
3		WICU			.098
4		WSEE			.083
5		CHCH	SOUTHAM-SELKIRK	N-TT-TR-RR	.076
6		CKGN			.073
7		WJET			.060
8		WXYZ			.030
9		WJBK			.017
10		WEWS			.024

50
10
/
60

TABLE 4.10 TELEVISION MARKET: Windsor CMA

MARKET HERFINDHAL INDICES: REVENUE = 1.00, AUDIENCE = .200

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CKLW				.194
2		WJBK			.253
3		WXYZ			.218
4		WWJ			.213
5		WKBD			.074
6		CKGN			.013

60 6 / 66

TABLE 4.11 TELEVISION MARKET: Winnipeg CMA

MARKET HERFINDHAL INDICES: REVENUE = .523, AUDIENCE = .256

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CKY		MOFFAT	TR-RR	.299
2	CBWT		CBC		.326
3		KCND			.231
4		KXJB			.062
5		WDAZ			.039
6		KTHI			.034

66
6
/
12

TABLE 4.12 TELEVISION MARKET: Regina CMA

MARKET HERFINDHAL INDICES: REVENUE = .735, AUDIENCE = .615

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CKCK		ARMADALE	N-TR-RR	.746
2	CBKRT		CBC		.241

72 2 / 74

TABLE 4.13 TELEVISION MARKET: Edmonton CMA

MARKET HERFINDHAL INDICES; REVENUE = .390, AUDIENCE = .275

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CFRN		RICE	RR-TR	.366
2	CBXT		CBC		.237
3	CITV				.275
4		KXLY			.096

74
4
78

TABLE 4.14 TELEVISION MARKET: Calgary CMA

MARKET HERFINDHAL INDICES: REVENUE = .535, AUDIENCE = .329

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CFCN				.407
2	CFAC		SOUTHAM-SELKIRK	N-TT-TR-RR	.381
3		KREM			.101
4		KXLY			.090

78
4
/
82

TABLE 4.15 TELEVISION MARKET: Vancouver CMA

MARKET HERFINDHAL INDICES: REVENUE = .625, AUDIENCE = .188

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CHAN		WESTERN	)	
				TT-RR-TR)	.290
2	CHEK		WESTERN	)	
3	CBUT		CBC		.213
4		KVOS			.151
5		KOMO			.130
6		KING			.112
7		KIRO			.075
8		KCTS			.014
9		KSTW			.011

5. TELEVISION STATION AUDIENCE SIZE

Privately-owned television stations are not in business to produce programs. They are in business to produce audiences. These audiences, or rather, means of access to them, are then sold to advertisers. The product of a television station, audience exposures, is dimensioned in terms of people and time. Buyers of television time will be concerned with the size of the audience, the length of time for commercial exposure, and the price of this unit of time. In this section we analyse the factors which affect the size of audience attained by a television station. These audience size results are then used in subsequent chapters to analyse the pricing of 30 second prime time commercials and television station profits.

One of the prime determinants of the audience size of a particular television station is the number of potential viewers in the station's market. For a given standard of programming, the larger the potential audience of a station, the larger the actual audience size which can be expected.

Audience size is not a direct function of potential audience, however, since as the market grows additional over-the-air television broadcasting stations can be expected to emerge. Cable system subscribers may be presented with a further set of options. Although additional choice may serve to somewhat expand the total audience viewing all stations, the principal effect of new entrants can be expected to be a fragmentation of the audience of existing stations.[1]

Analysis along these lines would lead to the conclusion that the audience size of equally situated stations would be a function of average number of potential viewers per stations. But all stations are not equally situated. One factor which may limit the ability of a station to reach audiences is a non-local location. Stations located in distant markets, whether these be cities in the U.S. or Canada, are unable to adapt their programming either in timing or content to the exigencies of the local market. Signal reception may also be impaired. Distant stations available only via cable, although they may overcome reception difficulties, face a different type of handicap in that they are limited in their potential audience to a subset of the overall market, i.e. viewers in cable-equipped households.

A second difference between stations relates to the nature of their programming. The higher Canadian content and greater public affairs/public service orientation of the CBC can be expected to handicap CBC owned and affiliated stations in their competition for English-speaking audiences with CTV and Global affiliates. Similar effects may occur in competition with TVA affiliates for French-speaking audiences. Independent stations, in turn, suffer programming handicaps in that they lack the network advantage of having their programming costs spread over a large number of stations.

5.1 Model Specification

The model used to estimate the determinants of television station audience size attempts to capture all the principal aspects of the above discussion.[2] First, the model makes a station's audience size depend on the number of potential viewers in its market and on the

total number (including cable) of competing signals it faces. Second, the model allows for differences in the physical location of stations distinguishing between local stations, Canadian stations located in distant markets and U.S. stations. Canadian stations located in distant markets and U.S. stations are further differentiated according to whether they are available over-the-air or via cable-only. Finally, the model allows for differences in the network affiliation of local Canadian stations.

For a given standard of programming, audience size achieved by a television station can be expected to vary in direct proportion to the potential audience available. If all stations in a market have the same transmission and reception characteristics, and have access to the same program materials, they should achieve the same audience size. If AUD is the prime time audience achieved by the station, N the number of stations in the market, and POP the population in the market,

$$AUD = a_0 + a_1 \ (POP/N) \qquad (1)$$

If $a_0 = 0$ and $a_1 = .50$, in a four station market with 2000 homes the audience of each station would be 250. ✓

If one or more of these four stations does not broadcast from the local area it may be handicapped in attracting viewers. Such a station may be either a Canadian station located in a distant market but available over the air or a U.S. station available over the air. Even though they are available over the air, and regardless of network affiliation, stations which do not broadcast from the local market may

face some handicap in attracting viewers. These may result from an inability to tailor program content to local tastes, scheduling problems which result in many offerings being seen first on local stations, or simply impaired reception because of distance.

Consider the case where one of the stations is a U.S. channel available over the air. If the reduction in audience a station experiences as a result of being a U.S. over-the-air channel does not affect the audience of its competitors,

$$AUD = a_0 + a_1 (POP/N) + a_2 (POP/N) (OU) \qquad (2)$$

where OU is a variable taking the value 1 if a station is a U.S. over-the-air channel and zero otherwise. According to this equation, the effect of non-local location varies according to the audience a station would have attained had it had no handicap. If the audience of a U.S. over-the-air station is smaller than that of a typical Canadian station located in the market by the amount $a_2 = -.20$, the audience in this market of a U.S. over-the-air station would decline to 200 in the example above.

Alternatively, Canadian broadcasters may benefit from the U.S. location handicap of their competitor. The simplest hypothesis is that some portion of the handicap is captured and that the amount captured is allocated equally amongst Canadian broadcasters. For example, if there are four stations in a market, one of them being a U.S. over-the-air station, and c_1 is the proportion of the U.S. over-the-air handicap captured by others, then each of the three Canadian broadcasters achieves an increase in audience equal to $1/3\ a_2\ c_1\ (POP/N)$.

Error in Model:
p.87/92.

If you are an outside station you are
recapturing more than you are handicapped.

- Results are conceptually absurd.

On the other hand if there were two Canadian broadcasters and two U.S. over-the-air channels the total available for capture would be $2\ a_2\ c_1\ (POP/N)$ which would be split $2/3\ a_2\ c_1\ (POP/N)$ to each of the Canadian broadcasters and $1/3\ a_2\ c_1\ (POP/N)$ to each U.S. over-the-air channel, since each obtains a proportion of the handicap loss of the other. The estimating equation which results is

$$AUD = a_0 + a_1\ (POP/N) + a_2\ (POP/N)(OU) + a_3\ (POP/N)\left\{\frac{NOU-OU}{N-1}\right\} \quad (3)$$

where NOU is the number of U.S. over-the-air channels available in the market and $a_3 = -a_2 c_1 > 0$. The gain to a station resulting from a competitor's handicap in broadcasting from the U.S. is its share of the captured loss. With equal sharing, a station gains $1/(N-1)$ times the total amount captured from each U.S. over-the-air competitor. Each Canadian broadcaster competes with NOU such competitors while each U.S. over-the-air competitor competes with NOU-1. If $a_3 = .10$ in a market with two Canadian broadcasters, two U.S. over-the-air channels and 2000 homes, the audience for each Canadian broadcaster is 283 and that of each U.S. channel is 217 as opposed to 250 and 200 respectively in the no recapture case.

Canadian stations not located in the local market but available over the air can be included in the model in a parallel fashion using a variable OC taking on a value of 1 for such a station and zero otherwise. The number of such stations is denoted by NOC.

Certain of the stations which do not broadcast locally face an additional handicap in that they are available only to cable subscribers, a sub-set of the total market. The model can be generalized to treat the cable-only handicap of both U.S. stations and distant Canadian stations by defining variables CU and CC which take on the value 1 for a station falling in the respective category, zero otherwise. The number of stations falling in each category would correspondingly be denoted by NCU and NCC. The generalized estimating equation becomes:

$$\begin{aligned} AUD = a_0 + a_1 (POP/N) + a_2 (POP/N)(OU) + a_3 (POP/N) \left\{\frac{NOU-OU}{N-1}\right\} \\ + a_4 (POP/N)(OC) + a_5 (POP/N) \left\{\frac{NOC-OC}{N-1}\right\} \\ + a_6 (POP/N)(CU) + a_7 (POP/N) \left\{\frac{NCU-CU}{N-1}\right\} \\ + a_8 (POP/N)(CC) + a_9 (POP/N) \left\{\frac{NCC-CC}{N-1}\right\} \end{aligned} \quad (4)$$

Local stations, although they do not face the handicaps imposed by an out-of-market location or limitation to an audience of cable-subscribers, are not by any means equally situated regarding ability to attract audience. They offer different types of programming which have various degrees of attractiveness to potential viewers. If each station's programming were completely individualized it would, of course, be impossible to categorize and hence to analyse along this dimension. Fortunately, there is some degree of commonality in program offerings, principally as a result of network affiliation. Local television stations, if they broadcast in the English language will, with

the exception of a few independent stations, be affiliated with either the CBC or CTV networks. French language stations may be either CBC affiliates, independents, or TVA affiliates. CBC and CTV each offer a venue of programs which are identifiable and distinct from that offered by independents and TVA affiliates. If the programming of either of the major networks is relatively less attractive than the programming offered by independents and TVA affiliates, then the affiliates of this network will be handicapped in attracting audiences. This handicap can be analysed using the approach developed above to deal with non-local location and cable-only reception. The program content of a particular station can be described using a variable taking on the value of 1 if it is in the category described (zero otherwise):

CB	CBC owned or affiliate
CT	CTV affiliate
IN	Local Canadian independent station (including affiliates of Global and TVA networks)

and where NCB, NCT, and NIN are the number of CBC, CTV, and local independent stations available in the particular market.

Distinguishing the handicap and recapture of local stations in this way results in an estimation equation of the form

$$\begin{aligned} AUD = a_0 + a_1\,(POP/N) + a_2\,(POP/N)(OU) + a_3\,(POP/N)\left\{\frac{NOU-OU}{N-1}\right\} \\ + a_4\,(POP/N)(OC) + a_5\,(POP/N)\left\{\frac{NOC-OC}{N-1}\right\} \\ + a_6\,(POP/N)(CU) + a_7\,(POP/N)\left\{\frac{NCU-CU}{N-1}\right\} \\ + a_8\,(POP/N)(CC) + a_9\,(POP/N)\left\{\frac{NCC-CC}{N-1}\right\} \end{aligned}$$

$$+ a_{10}\,(POP/N)(CB) + a_{11}\,(POP/N)\left\{\frac{NCB-CB}{N-1}\right\}$$
$$+ a_{12}\,(POP/N)(CT) + a_{13}\,(POP/N)\left\{\frac{NCT-CT}{N-1}\right\}$$
$$+ a_{14}\,(POP/N)(IN) + a_{15}\,(POP/N)\left\{\frac{NIN-IN}{N-1}\right\} \quad (5)$$

5.2 The Data

Once market population is known, the principal data problems arise in determining which U.S. and non-local Canadian stations should be considered as competitors for audience share. All non-local stations must then be classified as to their availability over-the-air or via cable only. Finally, the network affiliation of local stations must be identified.

The Census Metropolitan Area, as defined by Statistics Canada, was used to define each market area. The 1974 population of each Census Metropolitan Area was obtained from BBM Coverage and Circulation Report: Television.[3]

Number of stations to be included in the market as competitors for audience share was determined by including all stations with one percent or more of the total prime-time CMA audience. Local audience for each station was measured by seven day average of total hours tuned 6:00 P.M. to 1 A.M. by all persons two years of age and over living in the station's CMA. Total audience for each station was based on the corresponding data for all markets in which the station was received. Audience information was obtained from BBM Coverage and Circulation Report: Television.[4]

It was possible to decide, in the case of U.S. stations and non-local Canadian stations, whether these were available over-the-air or via cable-only on the basis of information in the CBC report, Cable TV and Audience Fragmentation at Year End 1971.[5] A station was classified as over-the-air if the proportion of off-the-air viewing of the station in the market CMA is 50 percent or more of the proportion of all viewing of the station in the market CMA.

The network affiliation of local stations was obtained from the CRTC catalogue of cable television systems in Canada[6] supplemented as required by unpublished data on program categorization supplied by the CRTC Economic Planning and Analysis Branch.[7]

5.3 Empirical Evidence

The results of the estimation of equation (5) are shown in Table 5.1. The first value shown beside each variable is the estimated coefficient. The second value (shown in brackets) is the t statistic. Variables have been rearranged to show first all the handicap variables and second all the recaptured variables.

The estimated equation with an R^2 of .73, accounts for 73 percent of the variation in size of market audience achieved by a station. Market audience includes only viewers within the local CMA and excludes viewers in all other areas. The measure of potential audience, population divided by the number of stations in the market, was not found to be a significant determinant of the size of a television station's audience. This may well result because of difficulties defining N. Stations were included so long as they achieved an audience of 1 percent or more of prime time audience. In some markets small changes in this cut-off percentage could have important effects on the number included.

TABLE 5.1

TELEVISION STATION AUDIENCES

Dependent Variable	Market Audience	
Constant	-800.72 (.76)	
(POP/N)	-.020 (.41)	a_1
(POP/N)(OU)	-.005 (.30)	a_2
(POP/N)(OC)	-.030 (1.39)	a_4
(POP/N)(CU)	-.026 (2.59)**	a_6
(POP/N)(CC)	-.016 (.79)	a_8
(POP/N)(CB)	-.002 (.19)	a_{10}
(POP/N)(CT)	-.002 (.16)	a_{12}
(POP/N)(IN)	-.020 (2.24)**	a_{14}
(POP/N) $\left\{\frac{NOU-OU}{N-1}\right\}$	.075 (1.18)	a_3
(POP/N) $\left\{\frac{NOC-OC}{N-1}\right\}$	.078 (.83)	a_5
(POP/N) $\left\{\frac{NCU-CU}{N-1}\right\}$	.066 (1.31)	a_7
(POP/N) $\left\{\frac{NCC-CC}{N-1}\right\}$	.103 (1.17)	a_9
(POP/N) $\left\{\frac{NCB-CB}{N-1}\right\}$	.668 (1.18)	a_{11}
(POP/N) $\left\{\frac{NCT-CT}{N-1}\right\}$	.050 (.91)	a_{13}
(POP/N) $\left\{\frac{NIN-IN}{N-1}\right\}$	.022 (.54)	a_{15}
R^2	.73	

should be 70.

only two coefficients significantly different from zero.

-too many variables?

Analysis of station handicaps in attracting audience revealed the most important handicaps to be those faced by U.S. stations received via cable-only and by Canadian independent, including Global and TVA affiliates. The U.S. cable-only handicap amounts to 2.6 percent of such station's potential audience, i.e., potential in terms of population per station, and is significant at the 95 percent level of confidence. This finding, coupled with the insignificant handicap faced by U.S. stations received over-the-air, would point to the significance of restriction to a cable-audience as being an important factor in determining audience size.

Canadian independents, including Global and TVA, face a handicap of 2.0 percent of potential audience, in terms of population per station in attracting audience. This can be attributed to the limitations in their program offerings resulting from cost constraints. This handicap is significant at the 95 percent level of confidence.

Out-of-market Canadian stations show a sizeable handicap of 3 percent of potential audience, significant only at the 80 percent level of confidence. This in all likelihood reflects the poor signal reception of a small number of fringe Canadian stations. Non-local Canadian stations received by cable, local CBC stations, and local CTV stations, exhibit no handicap in attracting audience.

The recapture variables were not found to be significant. Therefore the estimates did not support the hypothesis that individual stations were able to recapture the audience losses suffered by their competitors. While insignificant, the estimated coefficient were larger in magnitude than the handicaps. This, while consistent with Besen's findings,[8] is implausible but since the coefficients were not statistically significant further analysis was not attempted here.

5.4 Conclusions

U.S. television stations available via cable-only and Canadian independents, including affiliates of Global and TVA, suffer significant handicaps in attracting viewing audience. Some fringe area non-local Canadian stations appear to be severely handicapped also.

American stations available over-the-air, non-local cable-only Canadian stations, CBC stations, and CTV stations appear to compete for audience on an equal footing when audience information for all 16 markets is taken into account.

There is no statistically significant evidence that audience lost by a disadvantaged station is recaptured by competitors.

CHAPTER 5

FOOTNOTES

1. The Canadian Broadcasting Corporation concludes "There is no evidence that, in general, people who become cable viewers, and who are hence able to avail themselves of the additional channels that cable TV brings, spend any more time watching television than they did before." Cable TV and Audience Fragmentation: At Year End 1971, Ottawa: Canadian Broadcasting Corporation, Research Department, 1972.

2. The basic approach adopted here derives from that used to estimate program rates for television time by Stanley M. Beson, The Value of Television Time and the Prospects for New Stations, Santa Monica, Cal.: Rand, 1973.

3. Bureau of Broadcast Measurement, BBM Coverage and Circulation Report: Television, Toronto: BBM, October 28 - November 10, 1974.

4. Ibid.

5. Canadian Broadcasting Corporation, Cable TV and Audience Fragmentation at Year End 1971, Ottawa: CBC Research, 1972.

6. Canada, Canadian Radio-Television Commission, Cable Television Systems in Canada, Ottawa: Information Canada, 1975.

7. CRTC categorization of programs September 29, 1974 - September 27, 1975, unpublished data supplied by CRTC Planning and Analysis Branch.

8. Stanley M. Besen, The Value of Television Time and the Prospects for New Stations, Santa Monica, Cal.: Rand, 1973, p.18.

6. THE PRICING OF TELEVISION TIME

Once the product of a television station, its audience, has been produced, this product must be priced for sale. The audience, or more precisely, the exposure of the audience to commercial messages, may be merchandised in a variety of ways, each of which involves a different type of price. The various prices reflect different degrees of station involvement in program production and advertising sales.

Some stations may quote a program rate. In this case, the purchaser acquires rights to a block of time and all advertising revenues earned therein but is responsible for all program production costs. Networks may purchase or produce programs and compensate affiliates for the use of their time in carrying these programs by sharing advertising revenues. Or, finally, a station may purchase or produce its own programs and earn all advertising revenue.

It is difficult, in Canada, to study the determinants of program rates since in nearly all cases these rates are not publicly quoted but rather are available only "on request", if at all. Time and data constraints have not permitted a detailed examination of revenue sharing and other network-affiliate financial arrangements. In this chapter, the third method of pricing television time is examined - the direct pricing of the commercial exposure. Since the amount of commercial time available on a station is limited by regulation, this commercial rate is an important determinant of advertising revenue. The purpose of the analysis is to identify, and measure the impact of, the various factors affecting the price of 30 second prime time television commercials.

Advertisers, in choosing between radio, television, and the various print media consider cost per thousand persons covered. Therefore audience size can be expected to be an important determinant of the price of commercial time on both radio and television. Since commercial time must be sold prior to the time of broadcast, actual audience cannot be a determinant of price. Rather, advertising rates will be influenced by measure of potential audience. These measures might include population in the station's market area or recent audience rating information on the station. Also, since buying power is premised on income, the income level of the potential audience can be expected to affect the rate which can be charged for commercial time.

Income levels and potential audience size affect the demand for commercial time but actual price setting may also be influenced by the ownership structure of the television industry and cross-ownership links with competitive media. Ownership structure may influence rate setting through concentration of control or cross-ownership arrangements at the local market level, or through the influence of group ownership (ownership of a number of television stations located in different markets) or cross-ownership at the national level.

When the analysis is conducted at the level of the local market the traditional industrial organization theory should apply. Markets characterized by a small number of firms and a high concentration of television advertising sales revenue could be expected to exhibit prices higher than the competitive norm because of the market power wielded by each of the sellers. Even if there is no formal collusion in the setting of advertising rates, when television advertising revenues are concentrated in a few hands firms become much more interdependent. They become much more unwilling to cut prices or otherwise compete vigorously for

advertising customers because of their recognition that such actions oligopoly harm their rivals and may stimulate retaliatory competitive responses.

When the analysis of the setting of advertising rates is conducted on a market by market basis, there are two ways of looking at ownership structure. The first is to consider only the pattern of ownership within the local market, i.e., whether two television stations in the market are owned by a group owner or whether a local television station is cross-owned by the owners of a local newspaper or radio station. The second is to examine the implications for the local market of the pattern of ownership of the broadcasting industry across Canada.

Consider first group (television/television) ownership. Multiple holdings of television stations in a single market would serve to reduce the number of competitors for the television advertising dollar in the local market. This could be expected to increase the interdependence of the remaining stations and to produce a tendency toward higher advertising rates. In actual fact, regulatory constraints have tended to make group ownership at the local market level uncommon.

It is, however, still possible that group ownership considered on a nation-wide basis may affect pricing behaviour. The question becomes, if groups are restricted to one television station per market, and hence cannot affect market concentration, what influence can group ownership have on advertising rates. One line of argument is that group ownership reduces the cost of collusion and hence increases its likelihood. This would happen if group ownership increased the probability that two firms operating in any given market would also compete in some other market. If collusion is more worthwhile where it applies to

more than one market, or if firms pair off as competitors in a number of markets, then advertising rates in excess of the competitive norm should be expected.

Alternatively, if important groups of advertisers consider viewers in different cities to be close substitutes for one another then the market power of stations in a particular city may be limited by the potential competition offered by stations in alternative cities. Groups, since they could influence the level of advertising rates in a number of cities simultaneously, could possibly have an enhanced ability to raise prices. This effect appears problematic since, as a general proposition, broadening the definition of the relevant market serves to reduce concentration. It seems unlikely that collusion which is unprofitable in a narrowly defined market would become profitable in a more broadly defined market.

In addition to the potential effects of group ownership, cross-ownership arrangements between newspapers, television stations, and radio stations may influence pricing. Take the case where one firm owns both a newspaper and a competing television station in the market. So long as the demand curve faced by each is less than perfectly elastic, then the interrelationship between demands should be taken into account. At the margin the interdependencies of demand, if significant, will cause the profit maximizing firm to alter the price of both newspaper space and television time from the price which would have obtained had they been priced independently.[1] If these effects were very important, the distinction between the market for television time and newspaper advertising space would blur and a single market for advertising time and space would result. On the other hand, if newspapers, radio and television

are not close substitutes then definitions implying separate markets become useful and cross-ownership effects of this type become less important.

If radio, television and newspapers all compete for the advertising dollar and the single market definition becomes more appropriate, cross-ownership amongst media may increase interdependence amongst firms and facilitate collusive pricing arrangements. The same demand (and cost) interrelationships that were operative in pricing decisions internal to the firm apply at the inter-firm level. The gains from conscious parallel action or collusion are determined by the nature and extent of the demand (and) cost interrelationships. If the demand for, say, TV commercial time were elastic but the supply inelastic, the effect of collusion or conscious parallelism would be minimal.

The same reasoning applies to groups owning both radio and TV stations in the same market. Of course, the empirical significance of these effects must be examined. As Peterman states:

> Once cannot simply assert that effects exist. They may not because the interrelations in demand (and costs) are not worth taking into account, collusion may not be feasible or worthwhile, and the joint firm may have little influence on the supply of radio audiences, so that joint ownership has no independent effect on TV rates.[2]

Again, as in the case for group ownership, cross-ownership defined on a nation-wide basis should be examined. Where advertising buyers consider audiences in one city to be a close substitute for those in another, and coverage in one medium to be a close substitute for coverage in another, cross-owned holdings in television, radio and newspapers may influence the setting of advertising rates in the

manner discussed above. Conglomerate ownership of a television station should not, however, be expected to influence advertising rate-setting.

6.1. Model Specification

There has been some controversy over the most appropriate approach to modeling the determinants of television and radio advertising rates.[3] This controversy hinges on the nature of the relationship between audience and advertising rates. Owen, who has argued that advertising rates and audience size are co-determined, examines advertising rates as a function of only area population, income, and various joint ownership variables.[4] Lago argues that effects of advertising rates on audience size in the same time period (via programming expenditures) can be expected to be minor. But even if there is significant interdependency, he argues it can be dealt with by using a two-stage lease squares model that acknowledges joint dependency but is able to produce an unbiased estimate of the audience-advertising rate relationship. The following analysis adopts the Lago approach.

First, audience estimates are prepared using the methodology of the previous chapter but allowing for the possible influence on audience size of various additional determinants of advertising rates. Then, these fitted audience values are used as one of the independent variables in the estimation of advertising rates. When ownership variables are defined on a market-by-market basis the model used to estimate these fitted audience values takes the form:

$$
\begin{aligned}
FAUD = {} & a_0 + a_1(POP/N) + a_2(POP/N)(OU) + a_3 \quad (POP/N)\left\{\frac{NOU - OU}{N-1}\right\} \\
& + a_4(POP/N)(OC) + a_5 \quad (POP/N)\left\{\frac{NOC - OC}{N-1}\right\} \\
& + a_6(POP/N)(CU) + a_7 \quad (POP/N)\left\{\frac{NCU - CU}{N-1}\right\} \\
& + a_8(POP/N)(CC) + a_9 \quad (POP/N)\left\{\frac{NCC - CC}{N-1}\right\} \\
& + a_{10}(POP/N)(CB) + a_{11} \quad (POP/N)\left\{\frac{NCB - CB}{N-1}\right\} \\
& + a_{12}(POP/N)(CT) + a_{13} \quad (POP/N)\left\{\frac{NCT - CT}{N-1}\right\} \\
& + a_{14}(POP/N)(GB) + a_{15} \quad (POP/N)\left\{\frac{NGB - GB}{N-1}\right\} \\
& + a_{16}(POP/N)(VA) + a_{17} \quad (POP/N)\left\{\frac{NVA - VA}{N-1}\right\} \\
& + a_{18}(POP/N)(IN) + a_{19} \quad (POP/N)\left\{\frac{NIN - IN}{N-1}\right\} \\
& + a_{20}POP + a_{21}INC + a_{22}AUDE + a_{23}HRF + a_{24}SHR + a_{25}TTM \\
& + a_{26}TRM + a_{27}TNM + a_{28}CBC + a_{27}CTTM + a_{28}CTRM + a_{29}CTNM \\
& + a_{30}CCBC \qquad (1)
\end{aligned}
$$

What is sample size? What is dep var?

Where ownership structure is defined on a nation-wide basis the appropriate changes in the group and cross-ownership variables in equation (1) must be made. The additional variables are defined below.

This approach allows for interdependency between advertising rates and audience size. It also permits consideration, in the audience equation, of the audience fragmentation effect of U.S. and non-local Canadian stations while permitting the exclusion of such stations, where they are not competitors for advertising revenue in the local market, from measures of competitive conditions and ownership structure in the local market. Since such stations are not based in the markets under consideration data on them is also excluded in the estimation of advertising rates, revenues, and profits.

Population POP of the market area in which the station operates may have an influence on advertising rates which is separate from its effect on audience size. Increases in the level of average incomes in the market area can be expected to increase advertising rates. Where RATE is the price of a 30 second commercial in prime time, FAUD is the fitted value of highest prime time local-market audience achieved by the station, POP is the population of the market area in which the station operates, and INC is the average income in this market area, then

$$RATE = a_0 + a_1 FAUD + a_2 POP + a_3 INC$$

This specification implies a target-audience approach by buyers of commercial time since only the local market audience affects advertising rates. Many television stations have large numbers of viewers outside their local CMA. The role these extra viewers play in rate setting can be examined by including in the model a variable AUDE representing the excess of total viewing audience of a station over its audience in the local CMA.

The structure and competitive conditions of the local market can be considered using both concentration and market share data. The Herfindahl summary index HRF measures concentration for a market as the sum of squared firm sizes. These sizes can be measured as a proportion of either total television station revenue, or audience for the market, depending on which is felt to provide a better indicator of competitive conditions. Since the Herfindahl index is calculated at the market level, a single value of the measure will apply to all firms in a given market. This value reflects the extent of interdependence amongst firms and the consequent expected effect on the general level of advertising rates. A firm's share

SHR of aggregate television station revenues or audience, for the market, on the other hand, reflects the market dominance of a particular firm. Incorporating the influence of these overall market structure variables results in

$$RATE = a_0 + a_1 FAUD + a_2 POP + a_3 INC + a_4 AUDE + a_5 HRF + a_6 SHR \quad (3)$$

The analysis above has indicated that, while continuing to consider advertising rate setting at the local market level, ownership structure can be considered at two different levels. The first, presumably more relevant for the purposes of economic analysis, is to examine ownership structure only in terms of the individual local market. Information on the ownership structure of individual markets permits evaluation of the degree of competition for audiences and for advertising revenues in these markets. The second approach would examine the competitive implications of ownership structure where group ownership and cross-ownership holdings located anywhere in Canada are considered. Once ownership structure is incorporated into the rate-setting model both approaches can be accommodated through an appropriate transformation of the structure variables.

Four principal dimensions of ownership structure can be identified. Consider first the definition of these on the individual local market basis.

Instances where two television stations in a given market have a common owner (TV/TV in market denoted as TTM) can be identified.[5] Ownership of a television station by the owner of a radio station in the same market (TV/Radio in market denoted as TRM) is one potentially important category of cross-ownership; ownership of a television station by the owners of a newspaper in the same market (TV/Newspaper in market denoted as TNM) is another. Public ownership (denoted CBC) can also be identified.

Since these variations in ownership structure influence the degree of competition they can be expected to influence not only the market behaviour of the firms characterized by multi and cross ownership, but the market behaviour of their competitors also. Reflection of this phenomenon requires inclusion of variables representing competition from a firm owning two television stations in a market CTTM, competition from a firm owning both a radio station and a television station in the market CTRM, and competition from a firm owning both a television station and a newspaper in the market CTNM. Competition with a CBC owned station can be denoted by CCBC.

Analysis of ownership structure on this market-by-market basis results in an estimating equation of the form

$$\begin{aligned} RATE = {} & a_0 + a_1 FAUD + a_2 POP + a_3 INC + a_4 AUDE + a_5 HRF + a_6 SHR + \\ & a_7 TTM + a_8 TRM + a_9 TNM + a_{10} CBC + a_{11} CTTM + a_{12} CTRM + \\ & a_{13} CTNM + a_{14} CCBC \end{aligned} \qquad (4)$$

Each of the ownership structure characteristics is described by a dummy variable taking the value 1 when the characteristic applies in the case of the firm at hand, zero otherwise.

In the alternative, Canada-wide specification of ownership pattern, analysis can proceed in a similar fashion once the appropriate changes in variable definition have been made. Ownership of a television station by a concern which owns another television station anywhere in Canada is denoted by TT. Ownership of a radio station anywhere in Canada by the owner of a particular television station is denoted by TR. Cross-ownership of a newspaper anywhere in Canada by a television station's owners is denoted TN. Competition by a television station with stations of the above types is denoted by CTT, CTR, and CTN respectively.

CBC ownership and competition with a CBC station continue to be denoted as CBC and CCBC respectively. Ownership of a television station by a conglomerate (i.e., a firm with important non-broadcasting assets) can be denoted CON; while competition with such a station is denoted CCON.

The estimating equation in the case of a Canada-wide specification of the ownership pattern remains in the same form as equation (4) with the appropriate re-specification of ownership structure variables.

6.2 The Data

The advertising rates used were obtained from the April 1975 issue of Canadian Advertising Rates and Data, a monthly trade publication prepared for the use of advertisers.[6] It contains data on station facilities, contract terms, and advertising rates for commercials at various times as well as some program rates. The advertising rates used in this chapter are those for 30 second commercials during prime time. Prime time varies slightly among stations, but typically it is the four evening hours between 7 p.m. and 11 p.m.

The use of quoted prices may be open to some criticism in that it is not clear what proportion of transactions take place at quoted prices. Since information on actual transaction prices is unavailable, data on quoted prices - which would serve as a point of departure in any negotiation - provide the best available measure of the prices at which commercial time sales take place. It is assumed that deviations between actual and quoted prices for a given station are small relative to price variations amongst stations and that the deviations are uncorrelated with any explanatory variables.

Two audience measures were used for each station. Both were obtained from BBM Coverage and Circulation Report: Television.[7] The station's audience within the CMA was measured, as explained in section 5.2, by the seven day average of total hours tuned by all persons two years of age and over living in the station's CMA. The station's total audience in all markets was measured by the corresponding seven day average of total hours tuned by all persons two years of age and over living in all areas served by the station.

Income data for each local market CMA was obtained from the Financial Post Survey of Markets 1974/75.[8]

The Herfindahl index of market concentration and the market share measure of firm dominance were developed on the basis of both revenue and audience measures. The construction of these measures was examined in detail in Chapter 4. Herfindahl indices on a revenue basis for each market were supplied by the Department of Communications. Use of revenue share data for regression purposes was permitted on an in-house basis under the supervision of the Department of Communications' staff. Herfindahl index and market share calculations were based on audience data for each station's audience in its local CMA.

A detailed description of the pattern of ownership television and radio stations in Canada, as of September 1975, is contained in the appendices of volume II of the report of the CRTC Ownership Study Group.[9] Supplementary information on newspaper cross-ownership was supplied by the Ownership Study Group. Identification of the ownership of CBC stations was on the basis of Cable Television Systems[10] in Canada as supplemented by information supplied by the Canadian Radio-Television and Telecommunications Commission.[11]

6.3 Empirical Evidence

Estimates of the determinants of television advertising rates were based on data for a sample of 34 stations. Twenty-two of the original fifty-six stations used in the estimation of audience size were omitted in the estimation of advertising rates because they were located outside the markets being studied. Ownership pattern and other market structure characteristics of the local market cannot plausibly be used to examine the determinants of the advertising rates of such non-local stations.

The result of the estimation of television station advertising rates are shown in Table 6.1. Equations (1) and (2) present the results of an ordinary least squares regression of advertising rate on market audience, population, income, the market structure variables of share and Herfindhal Index, and the various market definition-ownership structure variables. The two equations differ in that in the first, market share and the Herfindhal Index are based upon data for revenue obtained in the market, whereas in equation (2) they are measured in terms of audience. Equations (3) and (4) present the result of estimates of the advertising rate equation (4) developed in section 6.1 above. Equation (3) uses local market cross-ownership definitions while equation (4) uses nationally defined cross-ownership variables.

In equation (1) the effect of both market audience and conglomerate ownership are signficant at the 95% level of confidence. An increase in market audience of one thousand is estimated to add $17 to the advertising rate, whereas conglomerate ownership subtracts $154 from the rate. If there is, in fact, a joint dependency between

advertising rates and market audience, both of these results can be expected to weaken in the two-stage least squares estimate.

The Herfindhal Index in equation (1) which is based on revenue is significant at the 90% level but negative in sign. The estimated value suggests that an increase of .1 in the Index would decrease television advertising rates by $28. Normally, one would expect that a higher Herfindhal Index, since it indicates a higher level of market concentration, would lead to higher rather than lower advertising rates. A higher Herfindhal Index may indicate that one or two leading firms are greatly increasing their market shares and squeezing competitors out. These, possibly more numerous, competitors can be expected to have lower advertising rates as a result of their reduced audience size. Since each station appears as a single observation for the purposes of regression analysis what we may be observing in this estimated coefficient is the reduction in advertising rates suffered by the many small competitors in markets where concentration has increased. The positive, significant at the 80% level, coefficient on the revenue share variable is consistent with this analysis. An increase of ten percentage points in a firm's share of market revenue can be expected to lead to a $21 increase in advertising rates. Because of the ready availability, either over-air or via cable, of American and non-local Canadian channels severe audience fragmentation has occurred in many markets. It can be argued that any proper evaluation of competitive conditions should consider this competition for audience rather than focusing merely on revenue based measures of market share and the Herfindhal Index. The results of the estimation of equation (2) demonstrate that this concern has little foundation. Substitution

of audience-based measures of the Herfindhal Index and market share serve merely to reduce to explanatory power of the equation from .76 to .74 and to reduce the significance of the principal explanatory variables.

Equations (3) and (4) present the results of the two-stage least squares estimation of equation (4) of section 6.1. Lago in his estimation of U.S. television advertising rates found that only income, population and audience size appeared as significant variables in the two-stage least squares models.[12] In equation (4) the estimated coefficient of the per capita income variable is .135, significant at the 90% level. This would imply an increase of $135 in the television advertising rate as a result of a $1,000 increase in average per capita income in the CMA. In equation (3) the estimated coefficient for market population is .000088, significant at the 90% level. The implied effect is, however, small in magnitude since a 100,000 increase in CMA population would increase advertising rates only $8.80.

The more surprising finding is that contrary to the Lago finding, fitted values of market audience in a two-stage least squares approach are not significant determinants of television station advertising rates in Canada. In both equations (3) and (4) the estimated coefficients of fitted market audience are insignificant.

A finding of considerable interest to students of pricing behaviour is that concerning the role of AUDE, audience achieved in markets outside the station's CMA. In both equations (3) and (4) the estimated coefficient on this variable is insignificant. This result supports the hypothesis that buyers of television advertising time gear their purchasers to a target market audience and have little interest in audience gathered in non-targetted areas.

Cross-ownership variables defined on a national basis are superior in explanatory power to those defined on a market-by-market basis in the case of television advertising rates. Equation (4) which uses nationally defined cross-ownership variables is able to explain 76% of the variation in television advertising rates as compared to 68% in the case of equation (3). None of the individual variables in either case are significant at the 90% level of confidence. But in the case of the nationally defined variables, TV-Radio cross-ownership appears to increase television advertising rates by $217 but the result is significant only at the 80% level. Television-newspaper cross-ownership, on the other hand, appears to reduce television advertising rates by $189, again significant at the 80% level. Firms which compete with stations belonging to a national television-radio group appear to benefit by a $170 increase in advertising rates, but this finding is significant only at the 70% level of confidence.

6.4 Conclusions

When the inter-dependence between market audience and television station advertising rates is ignored, market audience is positively and significantly related to advertising rates, whereas the Herfindhal Index on a revenue basis and conglomerate ownership are significantly negatively related to advertising rates. When the inter-dependence between market audience and television station advertising rates is taken into account, these factors become insignificant as determinants of advertising rates.

Measurement of market share and Herfindhal Index on the basis of audience data, in order to take into account audience fragmentation by non-local stations, provides no significant improvement over revenue-based measures of these magnitudes.

Estimates of advertising rates which allow for the interdependence between market audience and the rate itself, support the hypotheses that population is positively related to television advertising rates and that per capita income in the station's market area is positively related to advertising rate. Some support is provided for the hypothesis that nationally defined television-radio groups, and stations competing with such groups, have higher advertising rates. There is also some evidence that television stations belonging to national television-news chains have lower advertising rates.

TABLE 6.1

TELEVISION STATION ADVERTISING RATES

Equation Number	1.		2.		3.		4.	
Dependent variable	RATE		RATE		RATE		RATE	
Constant	73.76	(.21)	57.17	(.13)	-224.44	(.55)	-659.22	(1.32)
Market audience	.017	(2.36)**	.015	(1.94)*				
Fitted market audience					-.0025	(.20)	.0093	(.91)
AUDE					.016	(1.28)	.0089	(.68)
POP	.000038	(1.16)	.000049	(1.13)	.000088	(1.91)*	.000053	(.94)
INC	.056	(.99)	.042	(.47)	.064	(.98)	.135	(1.83)*
HRF (revenue)	-280.76	(1.76)*			-111.32	(.64)	127.14	(.43)
HRF (audience)			-348.76	(1.08)				
SHR (revenue)	216.90	(1.53)			276.21	(1.56)	184.36	(1.02)
SHR (audience)			345.67	(1.29)				
TRM	-18.64	(.28)	-9.89	(.17)	65.74	(.95)		
TNM	-21.50	(.31)	-57.47	(.73)	-96.96	(1.41)		
CTRM	-52.18	(.77)	-28.45	(.151)	54.09	(.66)		
CTNM	97.14	(1.05)	88.55	(.89)	-17.64	(.19)		
CBC	-34.23	(.33)	-76.12	(.77)	-12.21	(.11)	7.88	(.06)
CCBC	13.50	(.15)	25.56	(.28)	13.68	(.13)	56.48	(.46)
TT							-83.89	(.61)
TR							217.46	(1.47)
TN							-189.48	(1.60)
CON	-154.29	(2.37)**	-126.68	(1.88)*			-92.16	(.66)
CTT							-62.16	(.52)
CTR							170.36	(1.18)
CTN							-111.97	(.75)
CCON	-118.60	(1.68)	-78.40	(1.18)			-48.60	(.47)
R^2	.76		.74		.68		.76	

Chapter 6 - Footnotes

1. See R.H. Coase, "Monopoly Pricing With Interrelated Costs and Demands", Economics, 13, N.S. 278, November 1946, pp.

2. John L. Peterman, "Concentration of Control and the Price of Television Time", The American Economic Review, Vol. LXI, No. 2, May 1971, pp.74-80.

3. See Armando M. Lago, "The Price Effects of Joint Mass Communication Media Ownership", Antitrust Bulletin, Vol. 16, 1971, pp.789-813.

4. Bruce M. Owen, "Empirical Results on the Price Effects of Joint Ownership in the Mass Media", Stanford: Stanford University Research Centre in Economic Growth, Memorandum No. 93, November 1969, as cited by Lago, p. 790.

5. Regulatory constraints cause this to be an empty set in nearly all markets.

6. Canadian Advertising Rates and Data, Toronto: Maclean Hunter, April 1975.

7. Bureau of Broadcast Measurement, BBM Coverage and Circulation Report: Television, Toronto: BBM, October 28-November 10, 1974.

8. Financial Post Survey of Markets 1974/75, Toronto: Maclean Hunter, 1974.

9. Canada, Canadian Radio-Television and Telecommunications Commission, The Contemporary Status of Ownership and the Level of Concentration in the Canadian Broadcasting Industry, Staff Study, Volume II, Ottawa: CRTC Ownership Study Group, 1977, unpublished.

10. Canada, Canadian Radio Television Commission, Cable Television Systems in Canada, Ottawa: Information Canada, 1975.

11. CRTC categorization of programs, September 29, 1974 - September 27, 1975, unpublished data supplied by CRTC Economic Planning and Analysis Branch.

12. Lago, op.cit., p.803.

7. TELEVISION STATION REVENUES, COSTS, AND PRICE-COST MARGINS

Developing an understanding of the factors affecting industry performance is one of the principle objectives of a study of an industry such as the television industry. Such an understanding permits the development of policies designed to alter these factors so as to improve industry performance. Since, in a market economy profits are one of the most important indicators of economic performance, this section focuses on an examination of the factors affecting profits in the television industry.

Previous sections have examined the factors influencing audience size and advertising rates. Neither of these is a measure of performance. Television stations may be interested in increasing audience size in order to justify higher advertising rates but they do not seek to maximize either audience size or advertising rate. As Owen, Beebe, and Manning have argued:

> "First, advertisers are interested not merely in the size of an audience, but in its characteristics. In the trade these audience characteristics are called "demographics," and refer to the age, sex, and income composition of the audience. Thus, some audiences of given size are more valuable than others. Second, a TV station may be able to maximize its audience only at prohibitive program cost. If TV station managers are rational businessmen, as their stockholders have every right to expect them to be, they will be interested in maximizing the difference between advertising revenue and costs, and this difference is of course profit. Thus, while it is certainly true that TV stations are interested in achieving as large an audience as possible for any given program expenditure, we should not expect to find stations seeking to obtain an indefinitely large audience regardless of the cost.
>
> ....
>
> To the extent that there is competition among stations and between TV stations and other media, individual TV stations have little choice but to attempt to maximize long-run profits. This does not mean that they are not good citizens interested in public-interest objectives. But they are engaged in a business, and have responsibilities to stockholders that cannot be disregarded."[1]

The question of whether or not privately-owned profit-seeking concerns should be permitted to participate in the television industry is not at issue here. Rather, the existence of these firms is acknowledged and their economic behaviour is analyzed. It is assumed that firms attempt to maximize long run profits taking due account of basic market limitations, behaviour of competitors, regulation, etc. CBC television stations, since they are publicly owned, play a mixed role. They compete for audience and advertising revenues with private stations but are not motivated by consideration of profit-maximization. Accordingly, the competitive effect of these stations must be taken into account in estimating the revenue and profitability of private stations. But revenues and profits of CBC stations themselves cannot properly be analyzed on the basis of a profit maximization assumption.

7.1 Price-Cost Margin of Television Stations

Information on both rates of return achieved by investors in broadcasting corporations and the profitability of broadcasting corporations themselves, was presented in Chapter 3. In attempting to ascertain the factors influencing these profit levels, it would seem natural to look directly to the various ownership structure and other market characteristics of the particular market in which each broadcasting corporation operates as prime determinants. This is logical but difficult to carry out in practice because of the multiple ownership of broadcast undertakings by single corporations and the commingling of broadcast and non-broadcast assets within a single corporation. Ownership structure and market characteristic variables can be related much more directly to the individual television station. To measure their impact on profitability it is necessary to turn to

some indicator of profitability which is available for individual television stations. The measure adopted here is the price-cost margin PCM defined as the ratio of operating income to total revenue. Total revenue R includes revenue from sale of air time and network payments to stations as well as production and syndication revenue. Operating income is the excess of total revenue over total expense E where the latter includes remuneration to employees, prcgram acquisition, technical sales and administrative expense. Therefore, price-cost margin can be defined as

$$PCM = \frac{R - E}{R} = 1 - \frac{E}{R} \qquad (1)$$

In chapters 5 and 6 the determinants of audience size and advertising rates were examined. If the volume of available commercial time, and television station expenses, are both relatively fixed then it is to be expected that the determinants of both revenues and price-cost margins would be closely related to the determinants of advertising rates previously examined. Before testing this proposition, consider the argument more closely.

R is primarily advertising revenue from sale of the station's product, audiences or the means of access to them, to advertisers. The advertising rate is the price of supplying the audience per commercial minute. Hence advertising revenue depends on the advertising rate and the number of commercial minutes sold. The maximum number of minutes that can be sold in a given time period is fixed by CRTC regulation and it may be a reasonable simplification to regard the number of minutes sold as equal to the maximum. Hence, where RATE is the advertising rate per commercial minute, and m is the number of

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commercial minutes, regarded as a constant, total revenue becomes a linear function of the advertising rate

$$R = m.RATE \qquad (2)$$

It can be argued that total expenses E do not vary significantly with the level of output of the firm; i.e., that E is largely a fixed cost which is not affected by the size of the audience sold to the advertiser.

If equation (2) is substituted in equation (1) and total expenses E and commercial minutes m are assumed constant, then it can be shown that the price-cost margin is a function of advertising rate

$$PCM = 1 - \frac{E}{m.RATE} \qquad (3)$$

This in turn implies that those factors important to the determination of advertising rates will be important to the determination of price-cost margins with the exception of differences in the order of magnitude of the effect. For example, with an advertising rate of $10 per minutes, 100 minutes available, and total expenses of $900, the price-cost margin would equal $(1 - \frac{900}{1000}) = .1$. Alterations in market factors producing a doubling of advertising rates to $20 would increase the price-cost margin by 5.5 times to $(1 - \frac{900}{2000}) = .55$.

Following this line of analysis, it is possible to estimate the determinants of price-cost margin in the same manner, using the same variables, as in the case of advertising rates. Price-cost margins become a function of audience, of market characteristics such as population and average income, of competitive condition variables such as the Herfindahl index and market share, and of the various ownership structure measures.

$$PCM = a_0 + a_1\ AUD + a_2\ POP + a_3\ INC + a_4\ HRF + a_5\ SHR + a_6\ TT + a_7\ TR + a_8\ TN + a_9\ CBC + a_{10}\ CON + a_{11}\ CTT + a_{12}\ CTR + a_{13}\ CTN + a_{14}\ CCBC + a_{15}\ CCON \quad (4)$$

Examination of the determinants of price-cost margins should not be concluded without consideration of the impact of local programming and Canadian content. It could be hypothesized that increases in either of these types of programming might reduce price-cost margins as a result of the combined effect of both revenue reductions attributable to possibly less attractive programming and cost increases resulting from the need to mount small scale local production efforts. When the 1975 total for minutes of local programming, on a full-day basis, denoted MLP, and minutes of prime time Canadian broadcasting, denoted MCB, are incorporated the model takes the form

$$PCM = a_0 + a_1\ AUD + a_2\ POP + a_3\ INC + a_4\ HRF + a_5\ SHR + a_6\ TT + a_7\ TR + a_8\ TN + a_9\ CBC + a_{10}\ CON + a_{11}\ CTT + a_{12}\ CTR + a_{13}\ CTN + a_{14}\ CCBC + a_{15}\ CCON + a_{16}^{40}\ MLP + a_{17}^{40}\ MCB \quad (5)$$

Both equation (4) and equation (5) can be estimated using the two stage least squares approach applied in the case of advertising rates.

7.2 Revenues and Costs of Television Stations

If the determinants of television station price-cost margins were found to correspond directly, save for a proportionality difference, to the determinants of station advertising rates no further analysis would be required. To the extent that results differ investigation of the source of these differences is called for.

The price-cost margin model presented above is premised on restrictive assumptions concerning the supply and price of television

time and the nature of the television station cost function. In this section, the determinants of the revenues and costs underlying the price-cost margin function are separately estimated in order to permit an investigation of the validity of these assumptions.

On the cost side, it has been assumed that total expenses E are fixed in amount regardless of the audience size, or market environment of a television station. The level of average incomes in the market can be expected to affect the wage rates paid technical, sales, and administrative personnel. As Rosse, Owen and Grey have argued,[2] it is possible that audience size, through its effect on advertising rates and revenues, will influence the level of program expenditures. Technical costs may increase with the geographical size of the market because of the need for a more powerful transmitter. Population may provide a reasonable, although imperfect, indicator of area of coverage and hence be considered a determinant of technical costs.

Ownership structure may influence operating costs of all types. Horizontal integration resulting in group ownership of television stations may occur because of managerial economies available to the owners of more than one television station. Operating and managerial economies may also occur when firms owning television stations also own radio stations, newspapers, or substantial non-broadcasting assets. Scale economies in program production would appear to be the most promising source of such economies. Local programming and Canadian content which may involve costly small scale production may influence television station expenses.

Examination of the determinants of television station expenses in this fashion requires estimation of a model of the form

$$E = a_0 + a_1 AUD + a_2 POP + a_3 INC + a_4 TT + a_5 TR + a_6 TN + a_7 CON + a_8 MLP + a_9 MCB \quad (6)$$

Returning to the question of television station revenues, it will be recalled that these were taken to be determined by advertising rates on the argument that commercial time was limited by regulation and most other revenues were insignificant. The actual significance of syndication and production and other non-advertising revenues is an empirical question. Also, advertising revenues are not necessarily a function of advertising rates. Not all stations may sell the permitted maximum amount of commercial time. Also the proportion of time sales transacted at prime time rates may vary significantly from one station to another because of variations in the definition of what constitutes prime time. Since revenues can be expected to be affected by the same factors that affect rates, although possibly to different degrees, examination of the importance of these qualifications requires estimation of a television station revenue model of the form

$$R = a_0 + a_1 AUD + a_2 POP + a_3 INC + a_4 HRF + a_5 SHR + a_6 TT + a_7 TR + a_8 TN + a_9 CBC + a_{10} CON + a_{11} CTT + a_{12} CTR + a_{13} CTN + a_{14} CCBC + a_{15} CCON \quad (7)$$

The model described in (5) and (6) can each be estimated using a two stage least squares approach based on the fitted audience estimates developed in chapter 6.

7.3 The Data

The new variables introduced in this chapter include minutes of local programming, minutes of Canadian broadcasting, and the dependent variables television station expenses, revenues, and price-cost margins. The sources of data for all other variables in discussed in previous chapters.

Information on the 1975 total minutes of local programming on a full-day basis, and minutes of prime time Canadian broadcasting, was obtained from the Economic Planning and Analysis Branch of the CRTC. The financial data on television station expenses and revenues is based on information supplied by the stations in their Annual Return Radio and Television filed annually by each station with Statistics Canada. This information was not supplied directly to the researchers but access to it was provided on an in-house basis at Department of Communications for purposes of empirical analysis.

7.4 Empirical Evidence: Price-Cost Margins

Price-cost margin estimates were based on a smple of 21 stations, the only station of the original in-market sample of 35 stations for which cost and revenue data were available. The result of the estimation of the price-cost margin models (4) and (5) developed in section 7.1 are shown in table 7.1. The estimates in equation (1) are based on market-defined ownership variables and minute of local programming and Canadian broadcasting are included. In both equations (2) and (3), nationally defined ownership variables are used but minutes of local programming and Canadian content appear only in equation (3). All estimates have high explanatory power ranging from 82 percent of observed variation in the case of equation (2) to a high of 87 percent of observed variation in the case of equation (3).

TABLE 7.1

TELEVISION STATION PRICE-COST MARGINS

Equation Number	1	2	3
Dependent variable	PCM	PCM	PCM
Constant	2.49 (.83)	4.13 (2.04)*	2.88 (1.17)
Market Audience	.000058 (.97)	.000060 (1.38)	
Fitted Market Audience			.000090 (1.93)*
POP	-.00000042 (1.32)	-.00000057 (2.52)**	-.00000082 (2.94)**
INC	-.00060 (1.21)	-.00082 (2.08)**	-.00034 (.72)
HRF	1.49 (1.00)	2.46 (1.50)	3.39 (2.04)*
SHR	-.23 (.19)	-1.51 (1.24)	-2.23 (1.81)*
TRM	.77 (1.77)*		
TNM	.47 (1.18)		
CTRM	-.38 .63		
CTNM	.99 (1.26)		
CCBC	.92 (1.37)		
TT		1.26 (2.14)**	.99 (1.64)
TR		.35 (.75)	.84 (1.46)
TN		-.94 (2.23)**	-1.17 (2.69)**
CTR		.21 (.44)	.17 (.39)
CON		1.19 (2.19)**	.80 (1.43)
MLP	.0000053 (1.18)		.0000060 (1.20)
MCB	.00000050 (.02)		-.000018 (1.00)
R^2	.84	.82	.87

d. of.

Although the estimate in equation 1, using market-based definitions of ownership variables, has high explanatory power with an R^2 of .84, it reveals only a single significant variable. This variable television-radio cross ownership on a market level is however of considerable interest. It indicates, at the 90% level of confidence, that such stations can be expected to exhibit a price-cost margin .77 greater than other stations. Since the average price-cost margin for all 21 stations sampled was only 1.78 an increase in profitability of this magnitude would be very important. Minutes of Canadian broadcasting and of local programming are revealed to have no significant impact on the price-cost margins of television stations.

If $P.C.M = 1 - \frac{E}{R}$ this should be < 1.

Equation 2 shows the results of regressing price-cost margin on market audience, market structure variable, population and income, and nationally defined ownership structure variables. Five variables are found to be significant at the 95% level of confidence -- population, income per capita, television-television group ownership, television-newspaper group ownership, and conglomerate ownership. The estimated coefficient of the population variable -.00000057 implies a .57 decrease in the price cost margin when CMA popula ion increases by 100,000. This may reflect increased technical costs in the face of larger coverage areas and increased signal interference. The -.00082 coefficient for per capita income implies a reduction of .82 in the price-cost margin for a $1,000 increase in per capita income. This may reflect increases in salaries and wages which outweight revenue effects in high income areas. The positive 1.26 coefficient for television-television chains and 1.19 for conglomerates imply corresponding increases in price-cost margin for

stations owned by such groups. A significantly lower price-cost margin of -.94 is indicated for television-newspaper groups (95% level of confidence).

The specification of equation 1 and 2 is valid only when price-cost margin and market audience are not interdependent. When they are, interdependence must be taken into account using some procedure such as two stage least squares. The estimates presented in equation 3 are developed using two stage least square based on fitted values of market audience as derived in Chapter 6. When the results of equation 2 and equation 3 are compared it can be seen that television-television group ownership and conglomerate ownership become insignificant factors in determining price-cost margin. This finding is consistent with the results of the analysis of group ownership and group profitability in Chapters 2 and 3. It will be remembered that the largest and most profitable groups were located in the largest markets. Presumably their stations also captured large audiences. When the influence of audience size is taken into account in the regression estimates, audience size itself become a significant variable, while television-television and conglomerate group ownership as well as per capita income become of lesser significance. Membership in a nationally defined television-newspaper group still results in a large -.1.17 decrease in price-cost margin. This finding is significant at the 95% level of confidence. Population remains significant at the 95% level with a coefficient of -.00000082. In the two-stage regression both the Herfindhal Index and market share are significant at the 90% level. The positive coefficient 3.39 of the Herfindhal Index implies an increase of .3 in the price-cost margin when the Herfindhal Index increases by .1. A 10% increase in market share

on the other hand appears to result in a .2 decrease in price-cost margin. These results for the Herfindhal Index provide interesting support for the hypothesis that market concentration in the local television market is a significant factor in determining levels of profitability. The negative share coefficient may indicate a reduction in profitability for those firms striving to attain and hold large market shares.

7.5 Empirical Evidence: Expenses

The television station expenses model (6) developed in section 7.2 was estimated both excluding, and including, minutes of local programming and minutes of Canadian broadcasting. The results are shown in equation 1 and 2 respectively of Table 7.2. All results are based on an analysis of the sample of 21 stations used in the previous section.

The principle findings are negative ones. Local programming and Canadian content do not appear to significantly affect television station expenses. Membership in national ownership chains appears to have little effect. Income is insignificant, but when minutes of local programming and minutes of Canadian broadcasting are excluded in equation 1 population has a statistically significant, at the 90% level, influence on television station expenses. The estimated coefficient implies an increase of 86 cents in expenses for each person added to the population of the station's CMA.

Market audience is shown to be positively related at the 95% level of confidence to television station expenses. Since there is some suspicion of interdependence and since the direction causality is not clear this result require further investigation.

7.6 Empirical Evidence: Revenues

In order to allow for interdependence between market audience and television station revenues the market audience model (7) developed in

TABLE 7.2

TELEVISION STATION EXPENSES (Millions of Dollars)

Equation Numbers	1	2
Dependent Variable	Expenses	Expenses
Constant	-4.30 (.98)	-3.22 (.48)
Marked Audience	.00029 (2.88)**	.00029 (2.67)**
POP	.00000086 (1.73)*	.00000088 (1.26)
INC	.0012 (1.26)	.0013 (1.06)
TT	-.87 (.60)	-.89 (.51)
TR	.67 (.60)	.67 (.42)
TN	.20 (.22)	.20 (.19)
CON	-1.48 (1.15)	-1.57 (.98)
MLP		-.00000082 (.05)
MCB		-.000021 (.42)
R^2	.77	.77

section 7.2 was estimated using two stage least squares. The model was estimated first on the basis of local market ownership structure variables and second using nationally defined ownership structure variables. In both cases the explanatory power of the estimated model was very high. R^2 in the case of the local market specification was .88; in the case of national ownership variables it was .89. In both cases estimates are based on the sample of 21 stations identified in section 7.4

In both specifications the positive relationship between fitted market audience and revenues is significant at the 95% level of confidence. The estimated coefficient in the market-by-market specification implies an increase of 10 million dollars in a stations revenue as a result of a 10,000 increase in its viewing audience; the corresponding figure for the nationally defined variable equation is 7.5 million dollars. Both values appear unreasonably high.

In equation 1 the estimated coefficient of the Herfindhal Index -14.63 is significant at the 90% level. This coefficient implies a decrease in a stations revenues of 1.4 million dollars when market concentration as measured by the Herfendal index increases by .1. As we have argued in the case of advertising rates, this result could occur when one or two firms come to dominate a market and force advertising rate and revenue reductions on their more numerous competitors. Still, it is difficult to reconcile this finding with the positive influence of the Herfindhal Index on price-cost margins observed in section 7.4.

The analysis of the pricing of television commercials in Chapter 6 revealed evidence of a positive relationship between income, market share and advertising rates. These findings are further substantiated by the

TABLE 7.3

TELEVISION STATION REVENUES (Millions of Dollars)

Equation Number	1	2
Dependent Variable	Revenue	Revenue
Constant	-.64 (.05)	17.70 (1.75)*
Market Audience		
Fitted Market Audience	.0010 (2.62)**	.00075 (3.25)**
POP	-.00000017 (.08)	.0000018 (1.61)
INC	.0020 (.83)	.0043 (2.15)**
HRF	-14.63 (2.00)*	-11.95 (1.50)
SHR	10.78 (1.66)	15.32 (2.57)**
TRM	-2.47 (1.00)	
TNM	-.92 (.43)	
CTRM	3.75 (1.00)	
CTNM	1.76 (.43)	
CCBC	-1.71 (.53)	
TT		-2.81 (.95)
TR		3.17 (1.36)
TN		-3.52 (1.66)
CTR		1.08 (.47)
CON		-3.39 (1.25)
R^2	.88	.89

results of equation 2. Income is found to be positively related to television station revenue at the 95% level of confidence. The estimated coefficient implies an increase of 4.3 million dollars in a stations revenue when per capita income rises by $1,000. There is evidence, significant at the 95% level, that a .1 increase in share of market revenue leads to a 1.5 million dollar increase in a station's revenue. This finding, however, does little to clarify the role of market share in the determination of price-cost margins since it difficult to see how an increase in share which increases a station's revenue should at the same time lead to a decrease in its price-cost margin. Ownership pattern variables defined on a national group basis are found to be statistically insignificant but the decrease in revenues attributable to national television-newspaper groups of 3.5 million dollars per station is significant at the 80% level of confidence.

7.7 Conclusion

Analysis of television ownership pattern on a market-by-market basis indicates that television-radio cross ownership at the local market level may contribute to significantly higher price-cost margin and profit rates in the television industry. The amount of local programming and Canadian broadcasting appears to have no effect on price-cost margins.

When the interdependence between market audience size and price-cost margin is ignored, per capita income, television-television group ownership, and conglomerate ownership appear to be significant determinants of price-cost margin. Since television-television group owned and conglomerate owned stations are generally located in the larger markets they can be expected to have both large audiences and high profits. When

allowance is made for this interdependence market audience becomes significant in determining the level of price-cost margins but television-television and conglomerate group ownership become insignificant. Membership in a television-newspaper ownership group results in a decrease of 1.1 in the price-cost margin. This increase is very large in size since the mean value for all stations of the price-cost margin was only 1.77 and the reduction was significant at the 95% level of confidence.

Increases in market population, when all other factors are taken into account, result in a significant decrease in price-cost margins. Market concentration at the local market level was found to be a significant determinant of price-cost margins resulting in a .3 increase with a .1 increase in the index. Market share, on the other hand, appeared to decrease price-cost margins, possibly as a result of undue programming and other expenditures devoted to achieving this share increase.[3] Analysis of television station expenses revealed Canadian content, local programming, and nationally defined ownership structure differences to be insignificant factors. The effect of per capita income levels was also statistically insignificant but population was found to be positively related to television station expenses. This latter finding supports the earlier argument that the negative role played by population in price-cost margin determination resulted from its impact on station expenses. It would be incorrect to read too much into the statistically insignificant relationship between market audience and expense level.

Market audience was found to be a statistically significant determinant of television station's revenues but the revenue increases implied by the estimated coefficients which ranged from 10 million dollars

to 7.5 million dollars as a result of a 10,000 increase in station audience appeared unrealistically large. When station revenues were estimated using local market ownership variables the Herfindhal Index of market concentration was negatively related to station revenues. This negative affect can be attributed to the impact which increased concentration may have on small competitors in a market. When national ownership variables were used per capita income and share of market revenue were both found to be positively related to an individual station's revenue showing. These findings support the earlier results concerning the pricing of television advertising time in Chapter 6. In general, nationally defined ownership structure variables were insignificant as determinants of television station revenues as were locally defined variables. However ownership of a station by a television-newspaper group appeared to have a large negative impact on its revenues.

CHAPTER 7 - FOOTNOTES

1. Owen, Bruce M., Jack H. Beebe and Willard G. Manning, Television Economics, Lexington, Mass.: Lexington Books, D.C. Heath, 1974, pp. 4-5.

2. Rosse, James N., Bruce M. Owen and David L. Grey, "'Economic Issues in the Joint Ownership of Newspaper and Television Media,' Comments in response to 'Further Notice of Proposed Rule Making,' Federal Communications Commission, Docket 18110." Memorandum No. 97, Stanford University Research Center in Economic Growth, Stanford, California, May 1970.

3. As Owen, Beebe, and Manning, op.cit., have argued in the citation above.

8. RADIO MARKETS

The Census Metropolitan Area (C.M.A.) is an appropriate and convenient definition of market area for radio as well as television. For each market it is necessary, for the reasons given in Chapter 4 to identify both the stations that are competing for advertising revenue and the additional stations that are competing for audience only. Competition for advertising revenue will also be affected by media cross-ownership occurring within a market.

8.1. Identification of Stations Competing for Revenue

The criteria adopted for determining whether or not a station is a revenue competitor in a market are similar to those employed for television. Subject to the provisos that the station is a commercial operation that sells advertising time and accounts for 1% or more of the Total Hours Tuned (All persons 2+, Monday through Sunday) in the Market C.M.A.,[1] the station is included if:

(a) it is located in the C.M.A.[2],

or (b) it is located outside the C.M.A. but within Canada and

(i) over 50% of the Total Hours Tuned (All persons 2+, Monday through Sunday) to the station are in the C.M.A.[3];

or (ii) the C.M.A. is the single largest market (in terms of total hours tuned) for the station and 20% to 50% of the Total Hours Tuned (All persons 2+, Monday through Sunday) to the station are from the C.M.A.

C.B.C. radio stations were phasing out advertising in 1974 and

are not included as revenue competitors. The provisos also resulted in the exclusion of religious stations VOAR and VOWR in St. John's, provincially owned CKUA-AM and FM in Edmonton, and all student radio stations. In contrast to television, a significant number of stations, not identified by DOC as located in the market, are included under criteria b(i) or b(ii). These stations are listed in Table 8.1 together with their actual location[4] and assigned markets.

In application of the criteria it was found that the overlap between the Toronto and Hamilton markets and the Vancouver and Victoria markets is not nearly as pronounced for radio as television; none of the Hamilton stations would qualify as a revenue competitor in Toronto, and none of the Victoria stations would qualify as a revenue competitor in Vancouver. As a consequence retaining Hamilton and Victoria as distinct markets does not pose a problem.

The stations assigned to the radio markets as revenue competitors are shown in Tables 8.2 to 8.17. For convenience these tables appear at the end of this Chapter, arranged in order from East to West. The format of the tables is the same as that employed for television markets in Chapter 4. To simplify inter-market comparisons, the Revenue Herfindhal Indices, calculated by DOC, are listed by market in Table 8.2. In general, revenue competition from U.S. stations is less important in radio than television. The Windsor market is probably the only one where it is substantial enough for our calculation of Revenue Herfindhal Index, which ignores such competition, to be biased upwards significantly.

TABLE 8.1. OUT OF MARKET STATIONS ASSIGNED AS REVENUE COMPETITORS

Station	Location	Market Assigned	Criteria b(i)	Criteria b(ii)
CFDR	Dartmouth	Halifax	✓	
CFLS	Levis	Quebec	✓	
CFGL-FM	Laval	Montreal	✓	
CKVL	Verdun	Montreal	✓	
CKVL-FM	Verdun	Montreal	✓	
CHLO	St. Thomas	London	✓	
CFTJ	Galt	Kitchener		✓
CFAM	Altona	Winnipeg	✓	
CFRY	Portage-la-Prairie	Winnipeg		✓
CFCW	Camrose	Edmonton		✓
CKNW	New Westminster	Vancouver	✓	
CFMI-FM	New Westminster	Vancouver	✓	
CJJC	Langley	Vancouver	✓	

TABLE 8.18. HERFINDHAL INDICES BY MARKET

Market C.M.A.	Revenue Herfindhal Index	Audience Herfindhal Index
St. John's	.521	.342
Halifax	.353	.271
Quebec	.421	.271
Montreal	.128	.112
Ottawa-Hull	.284	.221
Toronto	.268	.193
Hamilton	.482	.258
Kitchener	.435	.128
London	.351	.249
Windsor	.608	-
Winnipeg	.252	.290
Regina	.370	.291
Edmonton	.217	.207
Calgary	.251	.220
Vancouver	.181	.141
Victoria	.341	.157

8.2 Identification of Stations Competing for Audience

The criterion used to identify audience competitors is to include all stations with 1% or more of the Total Hours Tuned (All persons 2+, Monday through Sunday) in the C.M.A. As C.B.C. stations located in the market were not included as revenue competitors, they now appear as additional audience competitors. Stations assigned as audience competitors are listed in Tables 8.2 to 8.17 and their audience shares indicated. The Audience Herfindhal Indices are reported by market in Table 8.18.

A problem with the B.B.M. radio audience data used to apply this criterion is that the Total Hours Tuned to U.S. stations are not given. Hence we cannot identify U.S. stations with 1% or more of the audience and cannot use their market share as an input in the calculation of the Audience Herfindhal Index. With cable not a factor for radio, the consequence of this is probably serious only for the Windsor market. In Windsor the audience shares, of all Canadian stations received, amount to just over 60% of the total. Presumably the remainder is accounted for by U.S. stations. Under the circumstances, an Audience Herfindhal Index based on Canadian stations only would be misleading and hence none is reported.

8.3 Competition and Concentration in the Markets

For most markets the Revenue Herfindhal Index and Audience Herfindhal Index are lower for radio than for television. This reflects that in general there are more competitors. The larger markets again tend to have the lower concentration. Montreal has the lowest Revenue and the lowest Audience Herfindhal Index although this may be misleading as there is a question concerning the extent to which stations broad-

casting in different languages are really competing. If we ignore the unusual Windsor market, we find St. Johns has the highest concentration in both revenue and audience terms.

Within most of our markets, radio-radio cross-ownership is found. This usually, but not always, involves common ownership of an A.M. and F.M. station. In the calculation of Herfindhal Indices, the market shares of such stations are combined before squaring. This kind of cross-ownership can be noted immediately from Tables 8.2 - 8.17 as the same group name will appear for both stations. Cases of cross-ownership within a market which involve ownership of a radio station and a television station have already been identified in Chapter 4. The only remaining cross-ownership within a market is of the radio-newspaper (excluding television) variety and all involve the Southam-Selkirk Group. This Group owns CKOY-AM and FM and the Ottawa Citizen in Ottawa-Hull, CJCA-AM and FM and the Edmonton Journal in Edmonton, and CKWX and Vancouver Province in Vancouver.

Chapter 8 - Footnotes

1. Identified from B.B.M. Radio Circulation Report by Area, B.B.M. Coverage and Circulation Report: Radio, October 28 - November 10, 1974. This is the source for all market C.M.A. audience figures employed in this Chapter.

2. As identified by Department of Communications' files.

3. Identified from B.B.M. Radio Station Coverage Report, B.B.M. Coverage and Circulation Report: Radio, October 28 - November 10, 1974. This is the source for all audience breakdowns for individual stations in this Chapter.

4. The locations of these stations was obtained from Canadian Radio-Television Commission, List of Broadcasting Stations in Canada, Information Canada, Ottawa 1975.

TABLE 8.2. RADIO MARKET: ST. JOHN'S C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .521, AUDIENCE = .342

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CJON		STIRLING	TT-TR-RR	.343
2	VOCM		J.V. BUTLER	RR	.423
		CBN			.213
		VOWR			.012

TABLE 8.3. RADIO MARKET: HALIFAX C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .353, AUDIENCE = .271

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CHNS		L.F. DALEY	RR	
2	CHFX (FM)		L.F. DALEY	RR	.335
3	CHNX (SW)		L.F. DALEY	RR	
4	CJCH		CHUM	TT-TR-RR	.293
5	CFDR				.251
6		CBH			.101

TABLE 8.4. RADIO MARKET: QUEBEC C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .421, AUDIENCE = .271

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CJRP		CIVITAS	RR	.247
2	CKCV		TÉLÉMEDIA-BEAUBIEN	TT-TR-RR	.021
3	CFLS				.047
4	CHRC (AM)		TÉLÉ-CAPITALE	TR-RR	.428
5	CHRC (FM)		TÉLÉ-CAPITALE	TR-RR	
6	CFOM				.096
7		CBV CBV (FM)			.121

TABLE 8.5. RADIO MARKET: MONTREAL C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .128, AUDIENCE = .112

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CFCF		MULTIPLE ACCESS	TR-RR	.159
2	CFQR (FM)		MULTIPLE ACCESS	TR-RR	
3	CFOX		1WC-SLAIGHT	RR	.011
4	CJAD		STANDARD	RR	.130
5	CJFM		STANDARD	RR	
6	CJMS		CIVITAS	RR	.115
7	CKAC		TÉLÉMEDIA-BEAUBIEN	TT-TR-RR	.106
8	CKGM		STIRLING	TT-TR-RR	.115
9	CHOM (FM)		STIRLING	TT-TR-RR	
10	CKVL		TIETOLMAN	N/A	.138
11	CKVL (FM)		TIETOLMAN	N/A	
12	CFGL (FM)				.070
13	CKMF (FM)		CIVITAS	RR	.043
14		CBM	CBC		.081
15		CBM (FM)	CBC		
16		CBF	CBC		
17		CBF (FM)	CBC		

Note: N/A indicates this information was not available

TABLE 8.6. RADIO MARKET: OTTAWA C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .284, AUDIENCE = .221

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CFGO		BATON	TT-TR-RR	.089
2	CFRA		CHUM	TT-TR-RR	.394
3	CFMO (FM)		CHUM	TT-TR-RR	
4	CJRC		CIVITAS	RR	.096
5	CKOY		SOUTHAM-SELKIRK	N-TT-TR-RR	.134
6	CKBY (FM)		SOUTHAM-SELKIRK	N-TT-TR-RR	
7	CKCH		TÉLEMÉDIA-BEAUBIEN	TT-TR-RR	.095
8	CKCH (FM)		TÉLEMÉDIA-BEAUBIEN	TT-TR-RR	
9		CBO	CBC		.148
10		CBO (FM)	CBC		
11		CBOF	CBC		
12		CHOM (FM)	STIRLING	TT-RR-TR	.019

TABLE 8.7. RADIO MARKET: TORONTO C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .268, AUDIENCE = .193

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CKFM (FM)		STANDARD	RR	.350
2	CFRB		STANDARD	RR	
3	CFTR		ROGERS	RR	.137
4	CHFI (FM)		ROGERS	RR	
5	CHIN (AM)		LOMBARDI	RR	.016
6	CHIN (FM)		LOMBARDI	RR	
7	CHUM (AM)		CHUM	TT-TR-RR	.169
8	CHUM (FM)		CHUM	TT-TR-RR	
9	CKFH				.018
10	CKEY		MACLEAN-HUNTER	RR	.119
11		CBL	CBC		.078
12		CBL (FM)	CBC		
13		CJBC	CBC		
14		CFGM	1WC-SLAIGHT	RR	.040
15		CKDS (FM)	WESTERN	TT-TR-RR	.019

TABLE 8.8. RADIO MARKET: HAMILTON C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .482, AUDIENCE = .258

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CHAM		ROGERS	RR	.097
2	CHML		WESTERN	TT-TR-RR	.466
3	CKDS (FM)		WESTERN	TT-TR-RR	
4	CKOC		ARMADALE	N-TR-RR	.111
5		CFRB	STANDARD	RR	.118
6		CKFM (FM)	STANDARD	RR	
7		CBL	CBC		.044
8		CFGM	IWC-SLAIGHT	RR	.026
9		CHUM (AM)	CHUM	TT-TR-RR	.050
10		CHUM (FM)	CHUM	TT-TR-RR	
11		CHFI (FM)	ROGERS	RR	.025
12		CFIR	ROGERS	RR	

TABLE 8.9. RADIO MARKET: KITCHENER C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .435, AUDIENCE = .128

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CHYM		MACLEAN-HUNTER	RR	.205
2	CHYM (FM)		MACLEAN-HUNTER	RR	
3	CKKW		ELECTROHOME	RR	.198
4	CFCA (FM)		ELECTROHOME	RR	
5	CFTJ				.024
6		CFRB	STANDARD	RR	.157
7		CKFM (FM)	STANDARD	RR	
8		CFTR	ROGERS	RR	.109
9		CHFI (FM)	ROGERS	RR	
10		CBL	CBC		.063
11		CKOS (FM)	WESTERN	TT-RR-TR	.054
12		CHML	WESTERN	TT-TR-RR	
13		CHUM (AM)	CHUM	TT-TR-RR	.042
14		CHUM (FM)	CHUM	TT-TR-RR	
15		CJOY (AM)	SLATER-METCALF	RR	.028
16		CJOY (FM)	SLATER-METCALF	RR	
17		CKOC	ARMADALE	N-TR-RR	.017
18		CHAM	ROGERS	RR	.016
19		CKPC (AM)	R.D. BUCHANAN	RR	.022
20		CKPC (FM)	R.D. BUCHANAN	RR	

TABLE 8.10. RADIO MARKET: LONDON C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .351. AUDIENCE = .249

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CFPL (AM)		W.J. BLACKBURN	N-TT-TR-RR	.432
2	CFPL (FM)		W.J. BLACKBURN	N-TT-TR-RR	
3	CJBK				.215
4	CKSL				.096
5	CHLO				.046
6		CFCA (FM)	ELECTROHOME	RR	.051
7		CBL	CBC		.033
8		CJOM (FM)	STIRLING	TT-TR-RR	.021
9		CKWW	STIRLING	TT-TR-RR	
10		CKLW	BATON	TT-TR-RR	.010

TABLE 8.11. RADIO MARKET: WINDSOR C.M.A.

MARKET HERFINDHAL INDEX: REVENUE = .608

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CKLW		BATON	TT-TR-RR	.251
2	CKLW (FM)		BATON	TT-TR-RR	
3	CKWW		STIRLING	TT-TR-RR	.246
4	CJOM (FM)		STIRLING	TT-TR-RR	
5		CBE	CBC		.094
6		CHYR	ROGERS	RR	.012

TABLE 8.12. MARKET: WINNIPEG C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .252, AUDIENCE = .290

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CFRW (AM)		CHUM	TT-TR-RR	.138
2	CFRW (FM)		CHUM	TT-TR-RR	
3	CJOB (AM)		WESTERN	TT-TR-RR	.491
4	CJOB (FM)		WESTERN	TT-TR-RR	
5	CKY (AM)		MOFFAT	TR-RR	.103
6	CKY (FM)		MOFFAT	TR-RR	
7	CKRC		ARMADALE	N-TR-RR	.102
8	CFAM		KROCKER FAMILY	RR	.064
9	CFRY				.016
10		CBW (AM)		CBC	.068
11		CBW (FM)		CBC	

TABLE 8.13. RADIO MARKET: REGINA C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .370, AUDIENCE = .293

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CJME		RAWLINSON FAMILY	TR-RR	.291
2	CKCK		ARMADALE	N-TR-RR	.382
3	CKRM		G.G. GALLAGHER	RR	.244
4	CFMQ (FM)		G.G. GALLAGHER	RR	
5		CBK			.061

TABLE 8.14. RADIO MARKET: EDMONTON C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .217, AUDIENCE = .207

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CFRN (AM)		RICE	RR-TR	.138
2	CFRN (FM)		RICE	RR-TR	
3	CHED		MOFFAT	TR-RR	.318
4	CHQT				.238
5	CJCA (AM)				.147
6	CJCA (FM)				
7	CFCW				.063
8		CBX	CBC		.063
9		CKUA (AM)			.017
10		CKUA (FM)			

TABLE 8.15. RADIO MARKET: CALGARY C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .251, AUDIENCE = .220

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CFCN		MACLEAN-HUNTER	RR	.197
2	CFAC		SOUTHAM-SELKIRK	N-TT-TR-RR	.241
3	CHQR		WESTERN	TT-TR-RR	.219
4	CKXL		MOFFAT	TR-RR	.272
5	CHFM		MOFFAT	TR-RR	
6		CBR			.043

TABLE 8.16. RADIO MARKET: VANCOUVER C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .181, AUDIENCE = .141

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CFUN		CHUM	TT-TR-RR	.075
2	CHQM (AM)		Q BROADCASTING	RR	.164
3	CHQM (FM)		Q BROADCASTING	RR	
4	CJOR				.178
5	CJVB				.029
6	CKWX		SOUTHAM-SELKIRK	N-TT-TR-RR	.070
7	CKLG (AM)		MOFFAT	TR-RR	.128
8	CKLG (FM)		MOFFAT	TR-RR	
9	CKNW		WESTERN	TT-TR-RR	.225
10	CFMI (FM)		WESTERN	TT-TR-RR	
11	CJJC				
12		CBU (AM)			.051
13		CBU (FM)			
14		CBUF (FM)			

TABLE 8.17. RADIO MARKET: VICTORIA C.M.A.

MARKET HERFINDHAL INDICES: REVENUE = .341, AUDIENCE = .157

Number of Stations	Call Sign of Stations in the Market for Revenue Purposes	Call Sign of Additional Stations Competing for Audience Share	Name of Group for Canadian Stations (if applicable)	Nature of Group	Audience Share
1	CKDA		D. ARMSTRONG	RR	.189
2	CFMS (FM)		D. ARMSTRONG	RR	
3	CJVI		SOUTHAM-SELKIRK	N-TT-TR-RR	.246
4	CFAX				.200
5		CKLG (AM)	MOFFAT	TR-RR	.119
6		CKLG (FM)	MOFFAT	TR-RR	
7		CJOR			.061
8		CBU (AM)	CBC		.049
9		CBU (FM)	CBC		
10		CFUN	CHUM	TT-TR-RR	.024
11		CKNW	WESTERN	TT-TR-RR	.012
12		CFMI (FM)	WESTERN	TT-TR-RR	

9. RADIO STATION AUDIENCE SIZE

Privately-owned radio stations are similar to privately-owned television stations in that they are not in business to produce programs. They are in business to produce audience exposures which are then sold to advertisers. Audience exposures are dimensioned in terms of people and time. Buyers of air time will be concerned with the size of the audience, the length of time for commercial exposure, and the price of this unit of time. Because of the fundamental similarities between the radio and TV industries, it is possible to analyze the radio industry using the analytical approach developed in previous chapters for the television industry. This section analyzes the factors which affect the size of the audience attained by a radio station. Subsequent chapters use these audience size results and other data to analyze the pricing of 30 second prime time commercials and radio station profits.

One of the prime determinants of the audience size of a particular radio station is the number of potential listeners in the station's market. For a given standard of programming, the larger the potential audience of a station, the larger the actual audience size which can be expected. Audience size is not a direct function of potential audience, however, since as the market grows additional radio stations can be expected to start up. Additional choice may somewhat expand the total audience to all radio stations, but the principal effect of new entrants can be expected to be a fragmentation of the audience of existing stations.

Analysis along these lines will lead to the conclusion that the audience size of equally situated stations would be a function of

average number of viewers per station. But -- all stations are not equally situated. One factor which may limit the ability of a station to reach audiences is a non-local location. Radio stations strive for local identification, and this can be expected to hamper them in competing for audience in markets outside their prime market. Signal reception may also be impaired. In most markets, stations which broadcast on the FM band are at a competitive disadvantage as compared to AM stations because of the historically lower levels of acceptability of FM broadcasting and the restriction of some receiving sets to AM only.

A third difference between stations relates to the nature of their programming. The higher Canadian content and greater public affairs/public service orientation of the CBC can be expected to handicap CBC owned radio stations in their competition for English-speaking audiences with commercial stations.

Finally, differences in programming format may affect a station's ability to compete for audience share.

9.1 Model Specification

The model used to estimate the determinants of radio station audience size attempts to reflect all the principal elements of the above discussion. First, the model makes a station's audience size depend on a number of potential listeners in its market and on the total number (including major stations in neighbouring cities) of competing signals it faces. The model distinguishes between AM stations and FM stations and treats differently stations deriving major portions of their revenue in the local market and stations based in distant markets. Finally, the model allows for differences in the programming format of all stations.

For a given standard of programming, audience size achieved by a radio station can be expected to vary in direct proportion to the potential audience available. If all stations in a market have the same transmission and reception characteristics, and have access to the same program materials they should achieve the same audience size. If AUD is the total audience, in terms of hours tuned achieved by the station in the local CMA, N the number of stations in the market, and POP the population in the market,

$$AUD = a_0 + a_1 \ (POP/N) \qquad (1)$$

Certain stations received in the local market may have their principal audience in another city. Such stations may be handicapped in attracting audience either because of the strong identification of their programming with the distant local market, or by simple reception difficulties. If the reduction in audience station experiences as a result of this distance handicap does not affect the audience of its competitors,

$$AUD = a_0 + a_1 \ (POP/N) + a_2 \ (POP/N) \ J \qquad (2)$$

where J is a variable taking on the value 1 if a station is located outside the local CMA but inside Canada and either (a) over 50 percent of the total hours tuned for all persons two years of age and over to the station are from the local CMA or, (b) 20 percent to 50 percent of the total hours tuned to the station are from the local CMA and the local CMA is the single largest market for this station. In the case of local stations, J takes on the value zero. Non-local stations which are unable to satisfy either criterion (a) or criterion (b) are excluded from the market.

According to this equation, the effect of non-local location varies according to the audience a station would have attained had it had no handicap. Alternatively, local radio stations may benefit from the distance handicap of their competitors. The simplest hypothesis is that some portion of the handicap is captured and that the amount captured is allocated equally amongst local radio stations. As in the television model, if there were four stations in a market, one of them being a non-local station, and c_1 is the proportion of the distance handicap captured by the local stations, then each of the three local radio stations achieves an increase in audience equal to one third $a_2\ c_1\ (POP/N)$. The general estimating equation which results is

$$AUD = a_0 + a_1\ (POP/N) + a_2\ (POP/N)\ J + a_3\ \ (POP/N)\left\{\frac{NJ - J}{N - 1}\right\} \qquad (3)$$

where NJ is the number of non-local radio stations available in the market and $a_3 = -a_2$, $c_1 >$ zero. The gain to a station resulting from a competitor's non-local location handicap is its share of the captured loss. With equal sharing, a station gains $1/(N-1)$ times the total amount captured from each non-local competitor. Each local radio station competes with NJ such competitors while each distant stations competes with NJ - 1.

The handicap a station faces as a result of broadcasting on the FM band can be handled in a parallel fashion. A variable FM which takes the value 1 if a station broadcasts on the FM band and a value zero if it broadcasts on the AM band can be defined. Where NFM is the number of FM stations competing for audience in the market, the current importance of the FM handicap can be estimated using a model of the form

$$AUD = a_0 + a_1 (POP/N) + a_2 (POP/N) J + a_3 (POP/N)\left\{\frac{NJ - J}{N - 1}\right\} + a_4 (POP/N)FM + a_5 (POP/N)\left\{\frac{NFM - FM}{N - 1}\right\} \quad (4)$$

Stations offer different types of programming which have various degrees of attractiveness to potential listeners. Since each station's programming is much more individualized than in the case of television stations, analysis along this dimension is difficult. The programming format of radio stations are, however, categorized in broadcasting trade publications. Also, potentially significant factors such as, broadcasting in the language of a minority group, or broadcasting CBC programming are potentially important. Incorporation of the effect of these factors in the audience model requires definition of format variable reflecting these elements. Stations broadcasting in a language spoken only by a minority of the population in the home CMA can be coded MIN, while the number of such minority language stations can be coded NMIN. CBC-owned and affiliate stations can be coded CBC and CBCA respectively while the number of such stations is denoted NCBC and NCBCA. These and the format category of each station competing for audience in the market can be reflected in the model as

$$\begin{aligned} AUD = a_0 + a_1 (POP/N) &+ a_2 (POP/N) J + a_3 (POP/N)\left\{\frac{NJ - J}{N - 1}\right\} \\ &+ a_4 (POP/N) FM + a_5 (POP/N)\left\{\frac{MFM - FM}{N - 1}\right\} \\ &+ a_6 (POP/N) MIN + a_7 (POP/N)\left\{\frac{NMIN - MIN}{N - 1}\right\} \\ &+ a_8 (POP/N) CBC + a_9 (POP/N)\left\{\frac{NCBC - CBC}{N - 1}\right\} \\ &+ a_{10} (POP/N) CBCA + a_{11} (POP/N)\left\{\frac{NCBCA - CBCA}{N - 1}\right\} \\ &+ a_{12} (POP/N) CO + a_{13} (POP/N)\left\{\frac{NCO - CO}{N - 1}\right\} \\ &\quad \vdots \qquad\qquad \vdots \qquad\qquad \vdots \\ &+ a_{34} (POP/N) LA + a_{35}\left[(POP/N)\left\{\frac{NLA - LA}{N - 1}\right\}\right] \end{aligned} \quad (5)$$

Format variables are defined as:

COT contemporary

POP pop

MOR middle-of-the-road

CW country and western

EL easy listening

HM hit music, top 40, gold music

CL classical

JZ jazz

PR progressive

NE talk, information, and news

AD adult

MU multi-format or variety of music

LA multi-language

The programming format of each station can be described using a variable taking on the value of 1 if it is in the category described (zero otherwise).

9.2 The Data

Having defined the relevant market and determined market population, the principal data problems remaining arise in determining which station should be considered as competitors for audience share. All stations must then be classified as to whether they are local or out of market, AM or FM, minority language or not, and CBC owned or affiliated or not. Finally, the programming format of all stations must be determined.

The Census Metropolitan Area as defined by Statistics Canada was used to define each market area. The 1974 population of each

Census Metropolitan Area was obtained from the BBM Coverage and Circulation Report: Radio.[1]

Number of stations to be included in the market as competitors for audience share was determined by including all radio stations with one percent or more of the total CMA audience. Local audience for each station was measured by total hours tuned, Monday through Sunday, in the market CMA by all persons two years of age and over.[2] Total audience in all areas for each station was measured by total hours tuned, Monday through Sunday, in all areas by all persons two years and older. Audience information was obtained from the BBM Coverage and Circulation Report: Radio.[3]

CBC ownership and affiliation of radio stations was established using List of Broadcasting Stations in Canada.[4] Whether a station broadcasts on the AM or FM band and whether it broadcasts a language other than that used by the majority of persons living in the CMA, were both determined from Broadcaster, "Fall" '74 Directory: Radio Stations".[5] The same source also provided information on the programming format of each of the radio stations.

9.3 Empirical Evidence

Preliminary estimates of the audience model in radio proved to be incomplete. With the research team based in Edmonton and the data base and computer facilities located in Ottawa, these difficulties could not be overcome in time for inclusion by the June 30 filing date for this report. Supplementary radio audience estimations have been requested and when these results are supplied they will be analysed and included here.

Fragmentary results on hand suggest that the model in equation (5)

of section 7.1 can explain in excess of 60 percent of the variation in radio audience size, that FM and non-local location have a significant effect on audience size and that several of the individual handicap variables are statistically significant. Largest handicaps appear to result in the case of country and western stations, stations broadcasting in a language spoken by only a minority of the population in their CMA, and multi-format stations.

Chapter 9 - Footnotes

1. Bureau of Broadcast Measurement, BBM Coverage and Circulation Report: Radio, Toronto: BBM, October 28 - November 10, 1974.

2. Data on prime time audience was available for stations based in the local market but not for other non-local stations. Since the latter compete for audience share it was necessary to use a measure, total hours tuned, which was available for both types.

3. Bureau of Broadcast Measurement, op. cit.

4. Canada, Canadian Radio Television Commission, List of Broadcasting Stations in Canada, Ottawa: Information Canada, 1975, pp.1-3.

5. Broadcaster, "Fall '74 Directory: Radio Stations", November, 1974.

6. Ibid.

10. THE PRICING OF RADIO TIME

The product which a radio station produces, and sells, is the exposure of an audience to commercial messages. Sales methods in the radio industry correspond closely to those used in the television industry. Stations may quote a program rate for a block of time, networks may compensate affiliates for the use of their time in carrying network programs, or stations may produce their own programs and sell commercial spot time directly to advertisers.

Program rates for many Canadian radio stations are available only "on request"; when they are quoted program rates are not available on a consistent basis for programs of a single duration. Since the C.B.C., the largest radio network, was phasing out commercial advertising during 1975 network-affiliate revenue sharing was a relatively unimportant aspect of pricing in the radio industry. This chapter examines the third method of pricing radio time - the direct pricing of the commercial exposure. Because of the regulations limiting the amount of commercial air time this commercial rate can be expected to be an important determinant of radio advertising revenue and profits. The purpose of the analysis is to identify, and measure the impact of, the various factors affecting the price of 30 second prime time radio commercials. Advertisers, in choosing between radio, television, and the various print media consider cost per thousand persons covered. Therefore, in radio, as in television, audience size can be expected to be an important determinant of the price of commercial time. The audience which a station has in its home market may be more important for this purpose than audiences drawn from other areas. Since commercial time must be sold prior to the time of broadcast, actual audience cannot be a

determinant of price. Rather, advertising rates will be influenced by measures of potential audience. These measures may include population in the station's market area of recent audience rating information on the station. Also, since income levels affect buying power, the income level of the potential audience can be expected to affect the rate which can be charged for radio commercial time.

Income levels and potential audience size affect the demand for commerical radio time but actual price setting may also be influenced by the ownership structure of the radio industry and cross-ownership links with competitive media. Ownership structure may influence radio setting through concentration of control or cross-ownership arrangements at the local market level, or through the influence of group ownership (ownership of a number of radio stations located in different markets) or cross-ownership at the national level.

As in the case of television, the analysis of the radio industry is focussed on the discovery of anti-competitive affects of the ownership structure of the radio industry. Local markets characterized by a small number of firms and a high concentration of radio advertising sales revenue can be expected to exhibit prices higher than the competitive norm because of the market power wielded by each of the sellers, whether this be evidenced by formal collusion or merely increased interdependence amongst firms.

Again, as in the case of television, there are two approaches to the question of ownership structure. The first is to consider only the pattern of ownership within the local market, i.e., whether two radio stations in the market are owned by a group owner or whether a local radio station is cross-owned by the owners of a local newspaper or television station. The second is to examine the implications in the

local market of the pattern of ownership of the broadcasting industry across Canada.

Consider first group (radio/radio) ownership. Multiple holdings of radio stations in a single market would serve to reduce the number of competitors for the radio advertising dollar in the local market. This could be expected to increase the interdependence of the existing stations, to facilitate collusion in the pricing of advertising, and hence to produce a tendency toward higher advertising rates. In Canada most group radio holdings consist of a joint AM-FM operation owned by a single corporation.

When group ownership is considered on a nation-wide basis its impact cannot be traced to changes in market concentration. It may reduce the cost of collusion and hence increase its likelihood or it may be viewed as limiting potential competition offered by stations in alternative cities where important groups of advertisers consider listeners in different cities to be close substitutes for one another.

The analysis of cross-ownership arrangements between newspapers, television stations, and radio stations developed in Chapter 6 for the case of television applies with equal force to the radio industry. In the case where one firm owns both a newspaper and a competing radio station in the same market significant interdependencies of demand will cause the firm to alter the price of both newspaper space and radio commercial time from the price which would have obtained had they been priced independently. The same reasoning applies to groups owning both radio and TV stations in the same market.

If radio, television, and newspapers all compete for the advertising dollar cross-ownership amongst media may increase inter-

dependence amongst firms and facilitate collusive pricing arrangements. The gains from conscious parallel action or collusion are determined by the nature and extent of the demand (and) cost interrelationships. The empirical work in this chapter seeks to quantify the importance of these effects.

The influence of cross-ownership where defined on a nation-wide basis must also be examined. Where advertising buyers consider audiences in one city to be a close substitute for those in another, and coverage in one medium to be a close substitute for coverage in another, cross-owned holdings in television, radio and newspapers located in different markets may influence the setting of advertising rates.

10.1 Model Specification

In order to allow for interdependency between radio advertising rates and audience size a two-stage least squares model that acknowledges joint dependency but is able to produce an unbiased estimate of the audience-advertising rate relationship is used. First, audience estimates are prepared using the methodology of the previous chapter but allowing for the possible influence on audience size of various additional determinants of advertising rates. Then, these fitted audience values are used as one of the independent variables in the estimation of advertising rates. When ownership variables are defined on a market-by-market basis the model used to estimate these fitted audience values takes the form

$$
\begin{aligned}
FAUD = a_0 + a_1(POP/N) + a_2(POP/N)J + a_3 \quad & \left[(POP/N) \quad \left\{\frac{NJ - J}{N - 1}\right\}\right] \\
+ a_4(POP/N)FM + a_5 \quad & \left[(POP/N) \quad \left\{\frac{MFM - FM}{N - 1}\right\}\right] \\
+ a_6(POP/N)MIN + a_7 \quad & \left[(POP/N) \quad \left\{\frac{NMIN - MIN}{N - 1}\right\}\right] \\
+ a_8(POP/N)CBC + a_9 \quad & \left[(POP/N) \quad \left\{\frac{NCBC - CBC}{N - 1}\right\}\right] \\
+ a_{10}(POP/N)CBCA + a_{11} \quad & \left[(POP/N) \quad \left\{\frac{NCBCA - CBCA}{N - 1}\right\}\right] \\
+ a_{12}(POP/N)CO + a_{13} \quad & \left[(POP/N) \quad \left\{\frac{NCO - CO}{N - 1}\right\}\right] \\
& \quad \vdots \qquad \vdots \qquad\qquad \vdots \\
+ a_{34}(POP/N)MU + a_{35} \quad & \left[(POP/N) \quad \left\{\frac{NMU - MU}{N - 1}\right\}\right]
\end{aligned}
$$

$$
+a_{36}INC + a_{37}HRF + a_{38}SHR + a_{39}RRM + a_{40}RTM + a_{41}RNM
$$
$$
+ a_{42}CRRM + a_{43}CRTM + a_{44}CRNM \qquad (1)
$$

Where ownership structure is defined on a nation-wide basis the appropriate changes in the group and cross-ownership variables in equation (1) must be made. The additional variables are defined below.

This approach allows for interdependency between advertising rates and audience size. It also permits consideration, in the audience equation, of the audience competition effects of non-local Canadian stations while permitting the exclusion of such stations, where they are not competitors for advertising revenue in the local market, from measures of competitive conditions and ownership structure in the local market. Since such stations are not based in the markets under consideration data on them is also excluded in the estimation of advertising rates, revenues, and profits.

In general, the analysis of other variables parallels the

analysis of television advertising rates. The separate influence of POP of the market area in which the station operates is considered as well as the level of average incomes in that market area. Where RATE is the price of a 30 second prime time commercial, FAUD is the fitted value of highest prime time local-market audience achieved by the station, POP is the population of the market area in which the station operates, and INC is the average income in this area.

$$RATE = a_0 + a_1 FAUD + a_2 POP + a_3 INC \qquad (2)$$

Using only local market audience implies a target-audience approach by buyers of commercial time. Many radio stations have large numbers of listeners outside their local CMA. The role these extra listeners play in rate setting can be examined by including in the model a variable AUDE representing the excess of total viewing audience of a station over its audience in the local CMA. Alternatively, the audience variable could be redefined to include total audience in all areas.

Competitive conditions of the local market can be considered using the Herfindahl index of market concentration HRF and the firm's share SHR of aggregate radio station revenues or audience for the market. Incorporating the influence of these overall market structure variables results in

$$RATE = a_0 + a_1 FAUD + a_2 POP + a_3 INC + a_4 AUDE + a_5 HRF + a_6 SHR \qquad (3)$$

Ownership structure must be considered at two different levels. For the first, ownership structure in terms of the individual local market, variables must be added to represent multiple ownership of radio stations in a given local market RRM, ownership of a radio station by the owner of a television station in the same market TRM, and ownership of a radio station by the owners of a newspaper in the same market RNM.

In addition, wherever a radio station competes with a station in any one of these three categories this can be denoted by variables CRRM, CTRM, and CRNM respectively.

Analysis of ownership structure on this market-by-market basis results in an estimating equation of the form

$$RATE = a_0 + a_1 FAUD + a_2 POP + a_3 INC + a_4 AUDE + a_5 HRF + a_6 SHR + a_7 RRM + a_8 TRM + a_9 RNM + a_{10} CRRM + a_{11} CTRM + a_{12} CRNM \quad (4)$$

Each of the ownership structure characteristics is described by a dummy variable taking the value 1 when the characteristic applies in the case of the firm at hand, 0 otherwise.

In the alternative, Canada-wide specification of ownership pattern, analysis can proceed in a similar fashion once the appropriate changes in variable definition have been made. Ownership of a radio station by a concern which owns another radio station anywhere in Canada is denoted by RR. Ownership of a television station anywhere in Canada by the owner of a local radio station is denoted by TR. Cross-ownership of a newspaper anywhere in Canada by a local radio station's owners is denoted by RN. Competition by a radio station with stations of the above type is denoted by CRR, CTR, and CRN respectively. The estimating equation in the case of a Canada-wide specification of the ownership pattern remains in the same form as equation (4) with the appropriate re-specification of the ownership structure variables.

10.2 The Data

The advertising rates used were obtained from the April 1975 issue of Canadian Advertising Rates and Data, a monthly trade publication.[1] The advertising rates used in this chapter are those for 30 second prime time commercials. Prime time varies slightly among stations, but in the

10 A.M. As in the case of television deviations of actual transaction prices from quoted prices may present problems. It is assumed that such deviations for any given station are small relative to price variations amongst stations and that the deviations are uncorrelated with any explanatory variables.

Audience data was obtained from BDM Coverage and Circulation Report: Radio; format information from Broadcaster, "Fall '74 Directory: Radio Stations".[2]

Income data for each local market CMA was obtained from the Financial Post Survey of Markets 1974/75.[3]

The Herfindahl index of market concentration and the market share measure of form dominance were developed on the basis of both revenue and audience measures. The construction of these measures was examined in detail in Chapter 4. Herfindahl indices on a revenue basis for each market were supplied by the Department of Communications. Use of revenue share data for regression purposes was permitted on an in-house basis under the supervision of the Department of Communications' staff. Herfindahl index and market share calculations were based on audience data for each station's audience in its

The ownership structure of the radio industry, on both a local market and on a national definition, is based on information contained in the appendices of Vol. 2 of the report of the CRTC Ownership Study Group.[4] Supplementary information on newspaper cross-ownership was supplied by the Ownership Study Group.

10.3 Empirical Evidence

Because of the problems, cited in section 9.3, encountered in obtaining audience estimates it is not possible to present results for the two stage least squares estimation, over all stations, of the model (4) in section 10.1.

What is available are ordinary least squares estimates of advertising rates developed on the basis of this model but using actual audience data and a sample of all 56 AM stations in the 16 market areas. The results of this interim work appear in table 10.1. Equation 1 in this table shows the results of estimates based on market defined ownership pattern variables; equation 2 the results for nationally defined ownership pattern variables. Both sets of results are able to explain more than 90 percent of the variation in radio advertising rates.

The results for corresponding variables in the two sets of estimates are very consistent. Market audience is significant at the 99 percent level of confidence. However, until fitted audience values are available it is difficult to interpret this result. Both the Herfindahl index and market share show strong positive association with the level of advertising rates (significant at the 95 percent level of confidence). In equation 1 the estimated co-efficients imply an increase in advertising rates of $6.45, from a mean value of $41.43, when the Hertindahl index increases by .1. (The corresponding value in equation 2 is $4.32). The estimated share coefficient in equation 1 suggests a $3.35 increase in advertising rates would result from a 10 percent increase in a firm's market share ($3.88 in equation 2).

Both equations support the conclusion that an increase of 100,000

TABLE 10.1

RADIO ADVERTISING RATES

Equation Number	1.	2.
Dependent Variable	RATE	RATE
Constant	-.398(.02)	6.10(.28)
Market audience	.0011(8.78)**	.0011(8.51)**
Fitted market audience		
AUDE		
HRF	64.51(2.40)**	43.23(209)**
SHR	33.52(2.68)**	38.82(3.32)**
POP	.0000088(2.04)**	.0000089(1.87)*
INC	-.0070(1.54)*	-.0067(1.37)*
N	1.21(1.46)*	1.06(1.33)*
CBCA	2.07(.26)	2.47(1.33)*
RRM	1.95(.63)	
RTM	5.38(1.13)	
RNM	9.00(1.66)*	
CRTM	2.08(.57)	
CRNM	5.97(1.35)*	
RR		1.48(.33)
RT		.76(.24)
RN		6.98(1.34)*
CRR		
CRT		
CRN		3.18(.68)
R^2	.9066	.9020

in the population of a radio station's CMA would lead to an $8.80 increase in the cost of a 30 second spot commercial. Increases in per capita income appear to lower, by approximately $7.00 for each $1000 of per capita income, rather than raise, radio station advertising rates. Each additional radio station in a market appears to increase advertising rates by a little over a dollar but this results from improper treatment of N in this specification. Both of the latter results are significant at the 90 percent level.

These results support the conclusion that radio-newspaper cross-ownership is the single most significant ownership factor in the determination of radio advertising rates. The evidence is that cross-ownership of this type at the local market level add $9.00 to advertising rates; and that for firms belonging to national radio-newspaper chains it adds $6.98. Firms competing with local market radio-newspaper ownership groups appear to be able to increase their advertising rates by $5.97. All of these cross-ownership results are significant at the 90 percent level of confidence.

Chapter 10 - Footnotes

1. Canadian Advertising Rates and Data, Toronto: Maclean Hunter, April 1975.

2. For details see Section 6.2.

3. Financial Post Survey of Markets 1974/75, Toronto: Maclean Hunter, 1974.

4. Canada, Canadian Radio-Television and Telecommunications Commission, The Contemporary Status of Ownership and the level of Concentration in the Canadian Broadcasting Industry, Staff Study, Volume II, Ottawa: CRTC Ownership Study Group, 1977; unpublished.

11. RADIO STATION PROFITS, PRICE-COST MARGINS, REVENUES, AND EXPENSES

Analysis of audience size and advertising rates provides insight into the workings of the radio industry, but neither audience nor advertising rates are in themselves measures of economic performance. Various measures of industry performance are possible. Chapter 12 contains an evaluation of the impact of ownership structure in the radio industry on programming performance. This Chapter examines the factors affecting the level of profits and price-cost margins in the industry.

Radio stations may be interested in increasing audience size in order to justify higher advertising rates but they do not seek to maximize either audience size or advertising rate. It is assumed that firms attempt to maximize long run profits taking due account of basic market limitations, behaviour of competitors, regulation, etc. CBC radio stations, which by 1975 had largely discontinued paid commercials, compete for audience with private stations but are not competitors in the market for radio advertising. Accordingly, the analysis of revenues and profits is restricted to privately owned radio stations.

11.1 Profits of Radio Stations

Information on the profitability of broadcasting corporations and on the rates of return achieved by the investers in broadcasting corporations was presented in Chapter 3. Direct examination of the determinants of radio industry profits encounters the same methodological difficulties that arose in the case of the television industry, namely, the multiple ownership of broadcast undertakings by single corporations and the commingling of broadcasting and non-broadcasting assets with any single corporation. Fortunately, in the case of radio there are a

significant number of corporations in the industry which operate only a single radio station and do not possess significant non-broadcasting assets. For such stations the ownership structure and market characteristic variables applicable to the individual radio station can also be used in an analysis of the rate of return of the radio corporation.

The profit measure developed in Chapter 3, the overall return on total capital employed, is also employed in this Chapter. The Corporation's rate of return PFT is defined as the ratio of the total of interest plus after tax profits divided by the total of long term debt plus equity. A radio station's prospects for profit can be expected to be linked to audience size, location in a large high income market, and a favourable competitive position within that market. Audience size can be broken down into the two components audience within the station's home market CMA denoted AUD, and additional audience located outside its home market AUDE. Population POP and income INC can be introduced in the same way as in the advertising rate equations of Chapter 10. The firm competitive position in the market can be measured by the Herfindhal Index of market concentration HRF and by the firm's share of total advertising sales revenue SHR as well as the various ownership pattern variables. This would result in a radio corporation profit model of the form

$$\begin{aligned} PFT = {} & a_0 + a_1\,AUD + a_2\,AUDE + a_3\,POP + a_4\,INC + a_5\,HRF + \\ & a_6\,SHR + a_7\,RRM + a_8\,RTM + a_9\,RNM + a_{10}\,CRRM + \\ & a_{11}\,CRTM + a_{12}\,CRNM \end{aligned} \qquad (1)$$

In order to allow for feedback effects from profit rate to audience size this model can be estimated using the two stage least squares approach

applied in the case of advertising rates.

11.2 Price-Cost Margins of Radio Stations

The profit analysis of the previous section was restricted to corporations owning a single radio station and possessing only insignificant amounts of non-broadcasting assets. In order to broaden our examination of radio industry profitability to encompass corporations owning more than one radio station or possessing significant non-broadcasting assets it is necessary to revert to the price-cost margin methodology introduced first in the examination of television industry profits in Chapter 7. Again, if it is argued that total expenses do not vary significantly with the level of output of the firm (i.e., they are largely a fixed cost unaffected by the size of the audience sold to the advertiser) and that total minutes of of commercial time is relatively fixed by regulation, then the price-cost margin is a function of advertising rate and the appropriate price-cost margin model takes the form

$$\begin{aligned} PCM = {} & a_0 + a_1\ AUD + a_2\ AUDE + a_3\ POP + a_4\ INC + a_5\ HRF + \\ & a_6\ SHR + a_7\ RRM + a_8\ RTM + a_9\ RNM + a_{10}\ CRRM + \\ & a_{11}\ CRTM + a_{12}\ CRNM \end{aligned} \qquad (2)$$

This model can be estimated using the two stage least squares approach applied in the case of advertising rates.

11.3 Revenues and Costs of Radio Stations

Since a radio station's price-cost margin is merely the ratio of total revenue minus total expenses to total revenues, examination of the determinants of each of these magnitudes can provide a better understanding of the factors affecting radio industry profitability.

The level of average incomes in the market can be expected to affect the wage rates paid technical, sales, and administrative personnel. Audience size, through its effect on advertising rates and revenues, will influence the level of program expenditures. Technical costs will increase when a station requires a more powerful transmitter because it broadcasts either over a large geographical area or in an area characterized by high signal interference. A station's audience outside its home market CMA, denoted AUDE, may provide a useful proxy for the geographic distribution of a station's listening audience; population POP may provide a reasonable indicator of signal interference. The degree of competition in the market, as indicated by the Herfindhal Index of market concentration of advertising revenue HRF, may affect levels of programming expenditures.

Ownership structure may influence operating costs of all types. Horizontal integration resulting in group ownership of radio stations may occur because of managerial economies available to the owners of more than one radio station. Operating and managerial economies may also occur when firms owning radio stations also own television stations, newspapers or substantial non-broadcasting assets. Scale economies in program production would appear to be the most promising source of such economies.

Examination of the determinants of radio station expenses in this way requires estimation of a model of the form

$$E = a_0 + a_1 \text{ AUD} + a_2 \text{ AUDE} + a_3 \text{ POP} + a_4 \text{ INC} + a_5 \text{ HRF} + a_6 \text{ RRM} + a_7 \text{ RTM} + a_8 \text{ RNM} \quad (3)$$

Since the major source of radio station revenues is sale of commercial air time, it is to be expected that those factors which influence radio advertising rates should also play an important role in the determination of radio station revenues. This is not to argue that

the determinants should be identical since not all time sales are transacted at prime time rates and other sources of revenue such as sindication and production revenues do exist. Using the same factors employed in the analysis of radio advertising rates results in a model of radio revenues of the form

$$R = a_0 + a_1 \text{ AUD} + a_2 \text{ AUDE} + a_3 \text{ POP} + a_4 \text{ INC} + a_5 \text{ HRF} + a_6 \text{ SHR} + a_7 \text{ RRM} + a_8 \text{ RTM} + a_9 \text{ RNM} + a_{10} \text{ CRRM} + a_{11} \text{ CRTM} + a_{12} \text{ CRNM} \quad (4)$$

In order to eliminate the problem of joint dependency between radio station revenues and audience size this model can be estimated using a two stage least squares approach based on the audience estimates developed above in the first stage.

11.4 The Data

The dependent variables radio station expenses, revenues, price-cost margins and radio corporation profit rate are the only new variables introduced in this chapter. The source of data for all other variables is discussed in previous chapters.

The financial data on radio station expenses, revenues, and rates of return is based on information supplied by the station in their Annual Return Radio and Television filed annually by each station with Statistics Canada. This information was not supplied directly to the researchers but access to it was provided on an in-house basis at Department of Communications for purposes of regression analysis.

TABLE 11.1

RADIO CORPORATION PROFITS
(Corporations with a single radio station only)

Equation Number	1.
Dependent variable	Profits
Constant	-1.02(.25)
Market audience	-.0000046(.09)
Fitted market audience	
AUDE	
HRF	-1.37(.48)
SHR	
POP	
INC	.00055(.61)
CRNM	-.35(.76)
CRTM	-.070(.19)
POP/N	-.0000079(1.35)
CRN	
R^2	.53

11.5 Empirical Evidence: Radio Station/Firm Profits

Equation 1 of Table 11.1 shows the results of one estimation of the profits model (1) of section 11.1 over the sample of thirteen radio corporations owning a single radio station located in one of the sixteen sample markets.

This estimate explains 53 percent of the observed variation in profit rates but none of the variables are statistically significant. It will be noted that the specification of equation 1 differs in some details from that of model (1) of section 11.1. Further work is being done but it is entirely possible that, because of the small sample of stations/firms for which profit data exists, that statistically satisfactory results will be difficult to obtain.

Precent results suggest that population per station, a measure of market potential, is the most significant factor in determining profit rates of radio singles.

11.6 Empirical Evidence: Radio Station Price-Cost Margins

The results of two estimates of the price-cost margin model(2) of section 11.2 are presented in table 11.3. These results are based on an analysis of 56 AM stations and FM stations.

When ownership pattern variables are defined on a market-by-market basis both market audience and competition with a radio-television chain are positively related to the magnitude of the price-cost margin (significant at the 95 percent level). The estimated co-efficients imply a .23 increase in the price-cost margin as a result of an increase of 10,000 in a station's audience, and a differential of 1.06 for stations competing with a local market radio-television cross-holding. With average price-cost margins over the sample of 2.65 the magnitude of the latter co-

efficient is of particular interest.

When ownership variables are defined in terms of national group holdings they become insignificant in price-cost margin determination. Market share of revenue becomes significant at the 90 percent level with an estimated co-efficient implying an increase of .298 in price cost margin as a result of a .1 increase in market share.

11.7 Empirical Evidence: Radio Station Expenses

Estimation of the radio station expense model (3) from section 11.3 could only be carried out using ordinary least squares and based on market audience data because of the lack of fitted audience estimates.

The results of one such estimate appears as equation 1 of table 11.3. The model accounts for 61 percent of the variation in radio station expenses but none of the variables introduced is statistically significant (with the exception of market audience which may only reflect the incorrect specification). Further investigation of radio station cost functions is required.

11.8 Empirical Evidence: Radio Station Revenues

As in the case of radio station expenses because of the lack of fitted values of market audience it was not possible to estimate the radio station revenue model (4) of section 11.3 using two stage least squares.

The results of the ordinary least squares estimation based on actual market audience appear as equation 1 of table 11.4. The results account for 76 percent of observed variation in radio station revenues but only market audience and radio-television cross-ownership at the national

level are significant. Because of the potential interdependence between market audience and station revenues the estimated market audience co-efficient is suspect. The radio-television national group co-efficient which is significant at the 90 percent level of confidence implies negative differential of $384,000 in revenues for radio stations of this type.

TABLE 11.2

RADIO STATIONS PRICE-COST MARGINS

Equation Number	1	2
Dependent variable	Price-cost margin	Price-cost margin
Constant	.92(.34)	3.60(1.42)
Market audience	.000023(2.04)**	.000013(.89)
Fitted market audience		
AUDE		
FM		
HRF	-.049(.02)	-3.80(1.58)
SHR		2.98(1.84)*
POP		.0000000025(.00)
INC	.00030(.57)	-.00010(.18)
RRM	-.165(.42)	
RTM	-.281(.40)	
RNM	.13(.18)	
CRTM	1.06(2.59)**	
CRNM	-.029(.06)	
CBCA	.75(.59)	.55(.42)
POP/N	-.0000034(.53)	
RR		-.52(1.18)
RT		.041(.10)
RN		.229(.33)
CRR		
CRT		
CRN		.206(.37)
R^2	.27	.23

TABLE 11.3

RADIO STATION EXPENSES (dollars)

Equation Number	1.
Dependent Variable	Expenses
Constant	440,000(1.07)
Market audience	13.23(6.48)**
Fitted market audience	
AUDE	
POP	.0016(.04)
INC	-73.10(.69)
HRF	
RRM	
RTM	
RNM	
RR	54,411(.70)
RT	-68,000(.93)
RN	78,000(.67)
CRN	59,000(.68)
CBCA	62,000(.27)
R^2	.61

TABLE 11.4

RADIO STATION REVENUES (dollars)

Equation Number	1.
Dependent variable	Revenues
Constant	815,000(.50)
Market audience	67.74(7.48)**
Fitted market audience	
AUDE	
FM	
HRF	283,000(.18)
SHR	989,000(.95)
INC	-115(.30)
POP	-.084(.33)
RRM	
RTM	
RNM	
CRTM	
CRNM	
RR	31,000(.11)
RT	-384,000(1.41)*
RN	282,000(.63)
CRR	
CRT	
CRN	151,000(.42)
CBCA	436,000(.52)
R^2	.76

12. PROGRAM PERFORMANCE

This chapter examines the programing performance of television and radio in Canada in terms of program balance, diversity, and choice. Program performance is of concern in this study primarily because it is thought to be related to the structure of the broadcasting industry and to its source of revenue.

In Section 12.1 a model is developed which suggests that a broadcasting industry financed by advertising will provide inadequate balance, diversity and choice; inadequate is defined in the economic welfare sense that viewers and potential viewers could be made better-off at the same cost with a different program mix. In Section 12.2 the applicability of this model to the Canadian broadcasting industry is examined. We consider how the predictions of the model are affected by the presence of a regulatory body, the C.R.T.C., a Crown Corporation, the C.B.C., and some other specific characteristics of the Canadian industry.

In Section 12.3 an empirical study of performance is undertaken involving measurement of balance, diversity and choice. For television, balance and diversity are compared at the network level and according to whether stations are group owned or independent. In addition, diversity and choice are examined at the market level. Due to less data availability, the analysis of radio programing is, of necessity, less ambitious.

12.1 A Model Relating Program Performance to Industry Structure

A model, of the spatial competition variety similar to that employed by Steiner,[1] is developed to predict the program performance

of an industry comprised of private broadcasters financed by advertising revenue. The model is equally applicable to television programing and to radio programing. The broadcasters are assumed to be profit maximizers. The model presumes that programs can be classified into different categories in such a way that viewers/listeners regard programs within a category to be perfect substitutes. Obviously such an assumption is not descriptively realistic and has been subject to criticism.[2] We believe, however, that it is a valid simplification which permits useful insights into programing behaviour. Initially we also assume that each program costs the same to produce and assume that if different broadcasters in the same market simultaneously offer the same program type they will obtain an equal share of the total audience for this program type: these assumptions simplify the development of the model and the implications of relaxing them are considered later.

The product being sold by a broadcaster is station time and this is sold to advertisers. In the absence of evidence suggesting that some viewers/listeners are more valuable than others to advertisers, the worth of this time to advertisers depends on the number of people it exposes to the advertising message. Hence the advertising rate the broadcaster can charge is a function of audience size which itself depends on the program offerings. Thus the broadcaster will seek to maximize advertising revenue and, given our assumption of equal costs for programs, maximize profits by choosing the program mix that maximizes audience size.

The model describes and predicts the programing behaviour of competing stations, in an individual television market or an individual radio market, whose goal is maximization of audience. In Section 12.1.1

the model is developed for a single time period and in Section 12.1.2 is extended to a multi-period context.

12.1.1 The One-Period Model

Let V represent the audience that prefers a given program type, denoted by the subscript, to all other program types and hence will watch it when all program types are offered. Let α represent the proportion of viewers who will watch another category, given the program types offered and the non-availability of their preferred category; the subscripts attached to α denote the preferred category and the other category respectively.

One station will choose the program type, from n program categories, which maximizes:

$$V_1 + \alpha_{21}V_2 + \alpha_{31}V_3 \ldots\ldots + \alpha_{n1}V_n$$

$$V_2 + \alpha_{12}V_1 + \alpha_{32}V_3 \ldots\ldots + \alpha_{n2}V_n$$

$$V_3 + \alpha_{13}V_1 + \alpha_{23}V_2 \ldots\ldots + \alpha_{n3}V_n$$

$$\vdots \qquad \vdots \qquad \vdots \qquad\qquad \vdots$$

$$V_n + \alpha_{1n}V_1 + \alpha_{2n}V_2 + \alpha_{3n}V_3 \ldots\ldots + \alpha_{(n-1)n}V_{n-1}$$

In general terms, one station chooses program j which maximizes $V_j + \Sigma\alpha_{ij}V_i$ where i denotes the other n-1 program types.

A second station will duplicate the program offering of the first if:

$$(V_j + \Sigma\alpha_{ij}V_i)/2 > V_k + \Sigma\alpha_{ik}V_i$$

where i on the LHS represents the other n-1 program types and on the RHS represents the other n-2 program types, and k is the program type, assuming program j is produced, that maximizes $V_k + \Sigma\alpha_{ik}V_i$. If, for purposes of illustration we assume j is program type 1, then a second station will choose the program type that maximizes:

$$(V_1 + \alpha_{21}V_2 + \alpha_{31}V_3 \ldots\ldots + \alpha_{n1}V_n)/2$$

$$V_2 + \alpha_{32}V_3 \ldots\ldots + \alpha_{n2}V_n$$

$$V_3 + \alpha_{23}V_2 \ldots\ldots + \alpha_{n3}V_n$$

$$\vdots \quad \vdots \quad \vdots \quad \vdots$$

$$V_n + \alpha_{2n}V_2 + \alpha_{3n}V_3 \ldots\ldots + \alpha_{(n-1)n}V_{n-1}.$$

It should be noted that the values of $\alpha_{32}\ldots\alpha_{n2}$, $\alpha_{23}\ldots\alpha_{n3}$, and $\alpha_{2n}\ldots\alpha_{(n-1)n}$ will generally differ from their value when program 1 is not already offered. This is because some of the people who prefer program n, for example, will watch program 2 if it is the only program offered but may choose to watch program 1 if both 1 and 2 are offered.

For the n station case, where x_s is the number of duplications of program s, the nth station will produce the program for which $(V_s + \Sigma\alpha_{is}V_i)/(x_s + 1)$ is at a maximum. This will be an existing program j, rather than an unproduced program k, if:

$$(V_j + \Sigma\alpha_{ij}V_i)/(x_j + 1) > V_k + \Sigma\alpha_{ik}V_i.$$

A new station will produce an existing program if its potential share of the existing audience is greater than the known audience, V_k, for the unproduced program plus the viewers who switch from existing programs plus previous non-viewers who choose to watch k.

As in the 2-station case, each time a new program is produced, the potential size of the audience for the remaining unproduced programs is affected. There is a shift in the preference function indicated by changes in various α values. If the ratios of α values for unproduced programs change in favour of those with smaller known audiences, V_k, then further duplication is more likely, whereas if it changes in favour of those with larger known audiences, further duplication is less likely. Production of a new program also

affects the size of audience for existing programs. Indeed, with the addition of a new program, an existing program may even lose enough of its audience to the new program that another previously unproduced program may be able to attract a larger audience and hence replace it.

The one-period model indicates that audience maximizing behaviour by individual stations can obviously result in duplication of program types. The extent of duplication, given the number of program types and the number of stations is obviously a function of the relative size of V_i, the proportion of people who will watch another program when their first choice is not offered, and the effect on the potential size of audiences of the shift in preference functions when a new program is produced. If the assumption of equal shares of shared audiences is relaxed then the greater the equality in the share of the audience the greater the tendency to duplication. If the assumption of equal costs is relaxed there will be less duplication if the programs which attract the larger audiences are more expensive to produce and more duplication if they are less expensive to produce.

12.1.2 The Multi-Period Model

If one takes as the relevant time span for television an evening of 5 (or 6) hours of prime time divided into 10 half-hour periods, then with two stations there are 20 station-periods and for n stations there are 10n station-periods. The choice of this time span is an obvious one: most people have a break from viewing between the end of prime time one evening to the beginning of prime time the next evening and it is reasonable to assume that they begin viewing the next evening with the same preferences as they had at the start of the previous evening.

If preferences do not change within an evening of prime time, that is viewers have a constant marginal utility for all program types, then the multi-period case is simply a period by period repetition of the one-period program pattern.

The implication of the other extreme assumption, namely zero marginal utility for repeats of a program type within an evening of prime time viewing, is that it would pay a station to offer a new program k in the first station period for which:

$$V_k + \Sigma\alpha_{ik}V_i > (V_j + \Sigma\alpha_{ij}V_i)/(x_j + 1)$$

where, for this multi-period case, x_j is the number of station-periods in which program j is already offered; it is assumed that the audience for j is equally shared among these x_j station-periods. Obviously, there are considerable opportunities for diversity of offerings and program choice in given time periods.

A priori it would seem that the preferences of most viewers for most program types would lie between the constant marginal utility and zero marginal utility extremes. Diminishing marginal utility would occur in the ten-period time span but not to the extent that viewing any program type for more than 30 minutes provides zero utility. As a consequence, we can expect neither the period-by-period repetition of the first case, with the number of program types offered in an evening never more than the number of stations and very possibly less, nor the degree of diversity of offerings suggested by the latter. A viewer may or may not prefer a second offering of program j to a first offering of program k.

In the multi-period context radio differs significantly from television. The peak listening period tends to be the early morning

when people are having breakfast and going to work. Many people listening during this period are available to the broadcaster for a relatively short time, a time span too short for diminishing marginal utility to be a factor. This leads to the expectation that radio programing would be more repetitive than television programing.

12.2 Implications of the Model for Programing in Canada

The model developed presumed an industry comprised of private broadcasters each of which attempts to maximize profits by pursuing a programing policy aimed at maximizing its audience. Both the television and the radio broadcasting industries in Canada differ from this scenario in two important ways. These are the presence of a regulatory commission, the C.R.T.C., and a Crown Corporation, the C.B.C. The implications for programing of these and some other aspects of the Canadian industry are examined for television and radio in Sections 12.2.1 and 12.2.2 respectively.

12.2.1 The Model and Canadian Television Programing

In the initial development of the model we assumed that the cost of each program to the station is the same. As we have already noted, if the programs which attract the larger audiences are less costly then this would result in even more duplication and less diversity than predicted by the model. In Canada the programs with the highest audiences are mainly entertainment programs of a crime drama or situation comedy variety, both of which come under C.R.T.C. program category 7, procured at low cost from the U.S. A good insight into the economics of program purchasing versus production is provided by a C.R.T.C. paper published in the Symposium on Television Violence.[3] This paper indicates that the typical program imported by the Canadian

networks during the 1974-75 season could be purchased by them for about $2,000 per half hour episode although the cost to the U.S. producer would be about $125,000. The U.S. producer relies on sale to a U.S. network to cover its costs and any additional sales outside the U.S. are regarded as a bonus. With a limited market the Canadian producer spends about $30,000 on a similar type of program. It is scarcely surprising that Canadian viewers regard a program costing $30,000 to produce as inferior to one costing $125,000 to produce and hence fewer watch it. The advertising rate structure reflects this with the CTV prime time 30 second spot rate in January 1975 being 22% less for Canadian programs than foreign programs. The C.R.T.C. has estimated that, for the prime time schedule of January 1975, CTV was obtaining an average margin (revenue - costs) per half hour of $55 on Canadian programs compared with an average margin per half hour of $21,000 for foreign programs. Similar estimates for the CBC English prime time schedule are -$2050 and $20,600 respectively. When two specific programs of the same type are compared we find examples such as "Excuse My French," a Canadian situation comedy, with an estimated revenue of $16,000 and production cost of $30,000 per episode while 'MASH' brought in an estimated revenue of $24,000 for a purchase cost per episode of about $2,000.

The economics of program production and purchase are thus such that private broadcasters, if left to their own devices, would purchase the overwhelming majority of their programs from abroad. The primary influence of the C.R.T.C. has been to prevent this by the use of Canadian content regulations. For 1974-75, the year in question, the regulations required that for the twelve month period beginning

October 1st, 60% of a television station's total broadcast time between 6 a.m. and midnight, and 50% between 6 p.m. and midnight, be Canadian content. Co-productions with Commonwealth or French language countries qualify as Canadian content if 30% or more is spent in Canada on Canadian participation while co-production with other countries qualifies if the figure is 50% or more.[4]

Possible reactions of private broadcasters to such regulations include evasion and attempts to obtain exemption. There is evidence of both. In its Decision 75-594, the C.R.T. discussed "Global's difficulties in meeting the Canadian content regulations."[5] This suggests that Global was not achieving the required percentages. An attempt to obtain exemption from the regulations, or at least an amendment to ease the requirement, for all independents, was made by Global in 1975. The request was refused by C.R.T.C.[6]

Profit maximizing behaviour, subject to satisfying the regulatory constraint, would seem to entail either production of low cost Canadian programs in order to minimize possible losses or co-production with foreign producers in order to spread the cost of production and provide an expectation of selling abroad. Both routes seem to have been followed with "Police Surgeon" and "Swiss Family Robinson" being examples of the latter. Another reaction to be expected is that the Canadian content requirement in prime time is satisfied as far as possible by scheduling Canadian programs early and late in the evening with the most popular mid-evening time slots left for foreign programs. This has happened with the C.R.T.C. reporting:[7]

In three major metropolitan centres, important commercial

> Canadian English language stations have seen the percentage of Canadian programing hours per week, in the prime time 8:00 p.m. to 9:30 p.m. time period, fall from an average of 33% in 1966 to 19% in 1976, and at one station to 14%.

The C.R.T.C. has power to grant and renew licences. In such decisions the Commission has frequently stressed the need to provide local programing and the opportunity for local input.[8] This concern has extended into decisions concerning changes in ownership. In licencing second and third Canadian television services the C.R.T.C. has adopted the principle that new "broadcasters should complement and extend available programing and avoid unnecessary duplication of service."[9] Our model has suggested that audience maximizing and profit maximizing programing will often involve duplication. Once they have been granted a licence, we would expect new stations to avoid extension of available programing and provision of diversity when this is at the expense of audience and profits.

The Canadian television broadcasting industry also differs from that envisaged in the model because of the presence of a Crown Corporation. The C.B.C. does not rely exclusively on advertising revenue. Only about 20% of its revenue is from advertising with the major source of its income being annual parlimentary appropriations. As Richwood has noted,[10] however, the uncertainty associated with the size of the annual appropriations make the C.B.C. more reliant on the relatively stable source of advertising revenue than its share of the total might suggest. Thus although the C.B.C. would not be expected to act like the pure audience maximizer of our model, its partial reliance on advertising revenue would be sufficient reason for it not behaving like an Ideal Public Proadcasting Corporation (I.P.B.C.), to use

Steiner's term for a public broadcaster with the role of promoting a socially optimal pattern of program offerings which would maximize the utility of television set owners. Steiner has suggested that this would entail complementary programing whereby the I.P.B.C. would offer the otherwise unproduced program with the largest audience. Such a policy is approximated in Britain where B.B.C. 2 provides a complementary service. There is no general agreement, however, that complementary programing is likely to maximize utility. Blank, for example, argues that what people really want is more choice within the most popular categories.[11]

The Broadcasting Act (1968) provided the C.B.C. with a mandate to:

i. be a balanced service of information, enlightenment and entertainment for people of different ages, interests and tastes covering the whole range of programing in fair proportion,

ii. be extended to all parts of Canada, as public funds become available,

iii. be in English and French, serving the special needs of geographic regions, and actively contributing to the flow and exchange of cultural and regional information and entertainment, and

iv. contribute to the development of national unity and provide for a continuing expression of Canadian identity.

The mandate is thus to contribute to national goals and to provide

balanced rather than complementary programing. The fact that C.B.C. televises 'The Grey Cup', although this sporting event is simultaneously televised by CTV, indicates complementary programing is not an objective. One would expect C.B.C. to offer a smaller proportion of otherwise unproduced programs than I.P.B.C. but more than private broadcasters. Unless the stipulation to provide balanced programing is meaningless the implication is that C.B.C., to a greater extent than private stations constrained by Canadian content requirements and licence renewal considerations, is obliged in some time periods to offer program k rather than j although

$$(V_j + \Sigma\alpha_{ij}V_i)/(x_j + 1) > V_k + \Sigma\alpha_{ik}V_i.$$

If, indeed, C.B.C. offers a higher proportion of otherwise unproduced programs, then more program diversity can be expected from C.B.C. stations than private stations.

12.2.2 The Model and Canadian Radio Programing

The policies, and probable influence, of the C.R.T.C. with respect to radio programing have been similar to those already discussed in the context of television programing. The Canadian content regulations for A.M. radio, which came into effect in January 1973, were that 30% of the music played between 6 a.m. and midnight must be Canadian on the basis of at least two of the following criteria; performer, lyrics, music, or production.[12]

In granting and renewing licences, particularly F.M. licences, the C.R.T.C. has stressed the need to provide diversity and complementarity in programing. Thus, on May 28, 1968, the C.R.T.C. denied applications for four new F.M. stations because the "applicants did not undertake to provide significantly new or different programing.

opportunities to the communities concerned."[13] The announcement went on to say that the Commission would ensure that F.M. radio "be developed in such a way as to contribute to a more varied program service which will complement and enrich services already available from existing stations." The C.R.T.C. does not want F.M. stations offering the 'Rolling Format' employed by many A.M. stations. This format involves musical compositions interspersed with time, weather, traffic and similar announcements. It is inexpensive to produce and is entirely consistent with our multi-period model prediction of repetitive programing. On September 6, 1976, regulations came into effect to try and prevent this on F.M. The regulations require, between 7 a.m. and midnight, 25% 'Foreground Format' for F.M. stations within an A.M./F.M. group and 16% for independently owned F.M. stations. The 'Foreground Format' involves at least fifteen minutes uninterrupted presentation of a particular theme, subject, or personality.[14] As this specific requirement came into effect after the 1974-75 period for which we have programing data, it would not be a factor in this period.

In 1974-75 the C.B.C. was phasing out advertising on radio. There was thus no revenue incentive for C.B.C. to attempt to maximize its audience size and no financial reason why it should not produce different programing. The C.R.T.C. has always stressed that C.B.C. should provide the latter. Thus a C.B.C. proposal for 'Radio One' and 'Radio Two' was rejected by the C.R.T.C. (Decision 72-197) because the 'Radio One' proposal would "shift C.B.C. A.M. programing away from what is unique and bring it much too close to the programing already available on many of the privately owned stations."

12.3 Measurement and Analysis of Programing Performance

Programing performance is of interest for networks, or other groupings of stations, and for markets. For networks, or other groupings we are concerned whether the balance and diversity of groups differ. This is examined in Section 12.3.1. At the market level we are interested in the diversity of programs and the extent of choice offered to viewers in the different markets. This is studied in Section 12.3.2. In Section 12.3.3 a limited analysis of radio programing is undertaken.

The data used in this section was provided to us by the C.R.T.C. and the C.B.C. and is in the form of number of time units allotted by stations to each of the 14 C.R.T.C. Program Categories. Descriptions of these C.R.T.C. Program Categories appear in the Appendix to this chapter.

12.3.1 Balance and Diversity of Programing by Network

In order to measure the balance of programs offered, three broad categories of program are distinguished: Light Entertainment, Heavy Entertainment, and Information. Light Entertainment is defined to include C.R.T.C. categories 6, 7, 8, 9, and 14; Heavy Entertainment to include 10 and 11; and Information to include 1, 2, 3, 4, 5, 12, and 13. The aggregate proportion of each of these broad program categories is shown in Table 12.1 for the eight networks or other station groupings indicated. All of the stations in the network or group are included: the stations are not restricted to our fourteen markets. The Aggregate Proportion of, for example, Light Entertainment is defined as the number of minutes of Light Entertainment programs in the year divided by the total number of minutes of programing in the year. The Aggregate Proportions are shown for All Programs (Prime Time: 6 p.m. to midnight) and Canadian Programs (Prime Time) and apply for the year of September 29, 1974, to September 27, 1975.

TABLE 12.1. PROGRAM BALANCE AND DIVERSITY BY NETWORK

Network or Station Grouping	Number of Stations	All Programs (Prime Time) Aggregate Proportions					Canadian Programs (Prime Time) Aggregate Proportions				
		Heavy Entertainment	Light Entertainment	Information	D.I.	G.I.	Heavy Entertainment	Light Entertainment	Information	D.I.	G.I.
C.B.C. English Owned	16	.0140	.6537	.3323	3.08	.195	.0147	.4984	.4869	3.45	.156
C.B.C. French Owned	9	.0499	.6291	.3190	3.21	.186	.0273	.5538	.4201	3.57	.155
C.B.C. English Affiliates	28	.0137	.7174	.2690	2.91	.237	.0173	.5135	.4691	3.60	.165
C.B.C. French Affiliates	7	.0489	.7215	.2295	3.02	.215	.0276	.6467	.3257	3.54	.154
C.T.V. Affiliates	19	.0020	.7343	.2637	2.49	.354	.0023	.4712	.5264	3.07	.190
T.V.A. Affiliates	5	.0008	.8166	.1826	2.42	.299	.0150	.6571	.3413	3.03	.200
Global	1	.0002	.6773	.3263	2.03	.368	.0005	.3016	.6979	2.40	.263
Independents	4	.0005	.7280	.2715	2.82	.249	.0011	.4524	.5465	3.32	.172

The Aggregate Proportions for All Programs reveal that C.B.C. English Owned Stations, C.B.C. French Owned, and Global have substantially less Light Entertainment and more Information than the others. T.V.A. affiliates have substantially more Light Entertainment and less Information than the other groups. C.B.C. English affiliates, C.B.C. French affiliates, C.T.V. affiliates, and Independents have very similar proportions. For all groups the Aggregate Proportion of Heavy Entertainment is small. Nevertheless the C.B.C. French Owned Stations and the C.B.C. French affiliates have much more programing of this type than the other groups. The C.B.C. English Owned Stations and C.B.C. English affiliates, while lagging their French counterparts, also have substantially more than the miniscule proportions offered by the others. In summary, the C.B.C. French Owned and C.B.C. English Owned Stations do provide the best overall balance. Global provides as good a balance between Light Entertainment and Information but substantially less Heavy Entertainment, C.B.C. French Affiliates score well on the provision of Heavy Entertainment but not on the balance between Light Entertainment and Information.

When we examine the Aggregate Proportions for Canadian Programs, the interesting aspect to note is that C.T.V. affiliates, Global, and the Independents all show a higher proportion of Information programs than Light Entertainment although the All Program split is about 30% to 70%. Presumably the strategy of these groups is to use Information programs, which irrespective of their source are unlikely to be substantial money earners, to fill a good portion of their Canadian content requirements, hence permitting a very high percentage of their foreign programs to be of the lucrative Light Entertainment type.

Coding into the very broad categories of Information and Entertainment does provide insight into the overall balance of program offering but

indicates nothing about the balance within each broad category. To examine this a more disaggregated analysis, using the C.R.T.C. 14 categories, has also been undertaken and measurements of diversity and duplication made. The Diversity Index, D.I., a measure used by Land[15], is defined as:

$$D.I. = \sum_{j=1}^{n} m_j r_j / \sum_{j=1}^{n} m_j$$

Where m_j is the number of minutes of programing of category j, r_j is the rank order (1-14) of the category according to number of minutes of broadcasting, and n is the number of program categories (14). Hence the larger the value of the Index the greater the diversity. Maximum diversity, with an equal number of minutes devoted to each of the fourteen categories, would give a D.I. = 7.5, whereas minimum diversity, with all broadcast minutes devoted to one program category, would give D.I. = 1. The D.I. for each network or station grouping is shown in Table 12.1 for the year beginning September 29, 1974.

A good measure of diversity or its opposite, generic duplication, should reflect both the number and the size distribution of minutes allocated to the different program categories. In a different context we saw, in Chapter 2, that the Herfindhal Index has these characteristics. We thus propose to calculate what we shall call the Generic Duplication Index, G.I., defined as:

$$G.I. = \sum_{j=1}^{n} p_j^2$$

Where p_j is the proportion of programing allotted to program j and n is the number of categories. If all programs supplied have equal proportions, G.I. varies inversely with the number of program categories offered, while an increase in the inequality of program proportions would result in an increase in G.I. The minimum generic duplication, for fourteen

categories, would give G.I. = .071, whereas the maximum generic duplication would give G.I. = 1. To our knowledge, no one has used the Herfindhal Index concept as a measure of program duplication although the idea of using concentration measures is not new[16]. The G.I. for each network or station grouping is given in Table 12.1.

Table 12.1 reveals that D.I. and G.I. provide largely consistent rankings of network, or station grouping, programing performance. C.B.C. English Owned and C.B.C. French Owned Stations provide the most diversity/least generic duplication with a D.I. > 3.00 and a G.I. < .200. Next in performance are C.B.C. English Affiliates and C.B.C. French Affiliates followed by the Independents. The least diversity/most generic duplication is found in the programing of Global.

We conclude, consistent with our expectations in Section 12.2, that C.B.C. English Owned and C.B.C. French Owned Stations do provide the best balance of programing and the most diversity/least duplication.

12.3.2 Diversity and Viewer Choice by Market

Table 12.2 provides the D.I. and the G.I. for the fourteen markets for All Programs (Prime Time: 6 p.m. to midnight) for the year September 29, 1974, to September 27, 1975. The stations included in the markets, for purposes of calculating the D.I. and the G.I., are the Canadian stations identified as audience competitors in Chapter 4.

In the calculation of the D.I. for each market, the number of minutes devoted to each program type by each station are summed before the rank order is determined and hence the D.I. for the market is not simply the mean of the D.I. for the stations comprising the market. Unless the number of minutes devoted to different program categories by each station in the market is identical, the programing will to some extent be complementary and the D.I. for the market will be greater than

that of the average of the two stations. For example, in a two station market, if one station devoted all its broadcasting time to one program type, while the other station devoted all its broadcasting time to another program type then the Index for the market would be 1.50 whereas the D.I. for each station would be 1.00. Similarly, in the calculation of the G.I., the number of minutes devoted to each program type by each station are summed before squaring.

TABLE 12.2. DIVERSITY AND GENERIC DUPLICATION BY MARKET

Market	Number of Canadian Audience Competitors	D.I.	G.I.
St. John's	2	2.86	.254
Halifax	2	2.87	.246
Quebec	5	2.92	.230
Montreal	4	2.91	.265
Ottawa - Hull	8	2.79	.246
Toronto	6[1]	2.79	.253
Kitchener	6	2.63	.261
London	4	2.52	.282
Windsor	2	2.52	.284
Winnipeg	2	2.79	.231
Regina	2	3.05	.227
Edmonton	3	2.87	.244
Calgary	2	2.75	.276
Vancouver	3	2.68	.248

Note 1. Excludes C.I.C.A. for which no programing data was supplied.

The results in Table 12.2 reveal that, according to both the D.I. and the G.I., the least diversity/most generic duplication is offered in London and Windsor. As these are two of the three markets without a C.B.C. Owned Station, lack of such a station would seem to be the likely explanation. The other market without a C.B.C. Owned Station, Calgary, has the next highest G.I. although not the next lowest D.I. There is evidence therefore, that C.B.C. Owned Stations are responsible for more complementary programing than other stations. The best performance, most diversity/least generic duplication is found in Regina.

Over time the degree of choice is influenced not only by the diversity of program offerings, but also by each station's scheduling. For example, if in a two station market both stations provide five half hour programs of one program type and five of another in an evening then the average number of program options for the evening can vary from one, if both stations match their offerings so that the same type of program is offered on both channels during the same half hour, to two if the offerings are staggered so that there is no duplication in any half hour.

Viewer choice is analyzed for Canadian markets for prime time (6:30 p.m. to 11:30 p.m.) for the week of November 3 - 9, 1974. Two indicators of choice are calculated, the Average Number of Options and and the Proportion of Options, which are defined as follows:

$$\text{Average No. of Options} = \frac{\text{Summation of the No. of Options Each 1/2 Hr. Time Period}}{\text{No. of 1/2 Hr. Time Periods}}$$

$$\text{Proportion of Options} = \frac{\text{Summation of the No. of Options Each 1/2 Hr. Time Period}}{\text{Number of 1/2 Hr. Time Periods x Number of Stations}}$$

The denominator in the definition of Proportion of Options gives the maximum possible number of options. These measures of choice performance are calculated for each market for Canadian audience competitors, to find the choice offered by Canadian stations, and for all audience competitors to see the effect on choice of the availability, usually by cable, of U.S. stations. The stations included as Canadian and U.S. audience competitors are listed by market in the tables in Chapter 4. The criterion used to identify an audience competitor was that the station must account for 1% or more of the Total Hours Tuned in the market. As we noted in Chapter 4, this criterion excludes the P.B.S. Station in every market except Vancouver. This seems unfortunate because the P.B.S. Station does provide additional programing even if few people watch it. Hence it was decided, for the markets where P.B.S. is available, to also examine the choice provided by all audience competitors plus P.B.S. The only other significant effect of the 1% rule is to eliminate C.B.C. French Owned Stations in Toronto, Winnipeg, and Edmonton. Although a very significant choice for a small linguistic minority, these stations do not provide a relevant choice for the vast majority of people in these markets; hence no attempt is made to analyze their effect on choice.

Data on the C.R.T.C. program category offered by each Canadian station in each half hour time period in the week was supplied, on tape, by the C.R.T.C. Equivalent data for U.S. stations was derived by hand from program logs published in newspapers. The results are shown in Table 12.3.

TABLE 12.3: VIEWER CHOICE BY MARKET, NOVEMBER 3 - 9, 1974.

Market	Canadian Audience Competitors			All Audience Competitors			All Audience Competitors Plus P.B.S. (where available)		
	Number of Stations	Average Number of Options	Proportion of Options	Number of Stations	Average Number of Options	Proportion of Options	Number of Stations	Average Number of Options	Proportion of Options
St. John's	2	1.58	.792	2	1.58	.792	-	-	-
Halifax	2	1.65	.825	4	2.48	.620	5	3.33	.665
Quebec	5	2.61	.522	7	3.10	.443	-	-	-
Montreal	4	2.65	.662	7	3.30	.472	8	3.89	.487
Ottawa-Hull	8	3.44	.430	10	3.81	.381	-	-	-
Toronto[1]	6	3.25	.541	10	3.78	.378	11	4.35	.395
Kitchener	6	2.84	.474	9	3.31	.368	-	-	-
London[2]	4	2.42	.604	9	3.16	.351	10	3.71	.371
Windsor	2	1.70	.851	6	3.04	.506	-	-	-
Winnipeg	2	1.70	.851	6	2.70	.450	-	-	-
Regina	2	1.66	.831	2	1.66	.831	-	-	-
Edmonton	3	2.09	.697	4	2.32	.581	5	3.15	.629
Calgary	2	1.50	.752	4	2.25	.562	5	3.08	.616
Vancouver	3	1.67	.558	9[3]	3.35	.372	-	-	-

Footnotes:

1. This excludes C.I.C.A. for which program data was not available on tape.
2. Through an oversight C.J.E.T., a U.S. audience competitor in this market, was omitted.
3. This includes the P.B.S. Station, K.C.T.S., as station qualifies as an audience competitor.

An examination of the results for Canadian audience competitors reveals that the Average Number of Options does not increase proportionally with the number of stations. The more stations there are in a market, the less likely that any one of them is offering, in any half hour period, a program type different from all the others. This is best illustrated by the fact that, in general, the more stations there are in a market, the lower the Proportion of Options: the exception is Vancouver which with three stations has a lower proportion than Montreal and London with four. Thus eight Canadian audience competitors in Ottawa-Hull provide only twice as many choices as two competitors in Windsor and Winnipeg. The result that stands out is the low number of choices, for a three station market, provided in Vancouver. The Average Number of Options in Vancouver is less than that for the two station markets of Windsor and Winnipeg.

The results for all audience competitors show that the inclusion of U.S. audience competitors increases the Average Number of Options but at a decreasing rate as indicated in each case by a fall in the Proportion of Options. In Winnipeg, for example, the inclusion of four U.S. competitors increased the Average Number of Options by 1.00 from 1.70, the Average Number of Options provided by the two Canadian stations, to 2.70. In London, the addition of five U.S. competitors to the four Canadian competitors increases the Average Number of Options by only 0.74. To make it easier to see the incremental effect of U.S. stations on viewer choice, the increase in the Average Number of Options is shown in Table 12.4.

TABLE 12.4: THE INCREMENTAL EFFECT ON VIEWER CHOICE OF U.S. STATIONS

Market	Canadian Audience Competitors		U.S. Audience Competitors		P.B.S.	
	Number of Stations	Average Number of Options	Additional Number of Stations	Increase in Average Number of Options	Additional Number of Stations	Increase in Average Number of Options
St. John's	2	1.58	0	-	0	-
Halifax	2	1.65	2	.83	1	.85
Quebec	5	2.61	2	.49	0	-
Montreal	4	2.65	3	.65	1	.59
Ottawa-Hull	8	3.44	2	.37	0	-
Toronto	6	3.25	4	.53	1	.57
Kitchener	6	2.84	3	.47	0	-
London	4	2.42	5	.74	1	.55
Windsor	2	1.70	4	1.34	0	-
Winnipeg	2	1.70	4	1.00	0	-
Regina	2	1.66	0	-	0	-
Edmonton	3	2.09	1	.23	1	.83
Calgary	2	1.50	2	.75	1	.83
Vancouver	3	1.67	6	1.68	0	-

The effect of adding the P.B.S. station, for markets where this is applicable, on viewer choice is significantly different from the effect of adding U.S. commercial stations. As Table 12.3 indicates, in each case the addition of the P.B.S. station actually increases the Proportion of Options. In Toronto, we see from Table 12.4, that one P.B.S. station adds more to viewer choice than four U.S. commercial stations. Obviously P.B.S. does provide complementary and different programs. Its low audience ratings, however, leads one to wonder whether this is what viewers want.

Another matter of interest is the effect of cable on viewer choice. In a number of markets the Canadian audience competitors are received off-the-air while U.S. stations are received by cable. For such markets the effect of cable can readily be deduced from Table 12.3. For other markets the distinction is not so simple. CFTM and CKTM in Quebec, and CFTM, CFCF, and CKWS in Ottawa-Hull are received by 'cable only'. In Toronto, all stations except CKVR, and in Kitchener all stations except WBEN and WKBW are received 'off-the-air'. KCND in Winnipeg and KVOS in Vancouver are received 'off-the-air'. Following the usage in Chapter 5, a station is classified as 'off-the-air' if the proportion of 'off-the-air' viewing allocated to a station in the market is 50% or more of the proportion of cable viewing allocated, if the proportion is 50% or less the station is considered to be 'cable only'.

The effect of cable on the Average Number of Options is shown by market in Table 12.5. The 'Off-the-Air Plus Cable' results include the P.B.S. station, if any. The markets of St. John's, Windsor and Regina are omitted because they have no cable service. The increase in the Average Number of Options varies from "0.18" in Kitchener to 1.68

TABLE 12.5. THE EFFECT OF CABLE ON VIEWER CHOICE

	Off-the-Air		Off-the-Air Plus Cable		
Market	Number of Stations	Average Number of Options	Number of Stations	Average Number of Options	Increase in Average Number of Options
Halifax	2	1.65	5	3.33	1.68
Quebec	3	2.31	7	3.10	1.34
Montreal	4	2.65	8	3.89	1.46
Ottawa-Hull	5	3.10	10	3.81	0.71
Toronto	5	3.18	11	4.35	1.17
Kitchener	7	3.13	9	3.31	0.18
London	4	2.42	10	3.71	1.29
Winnipeg	3	2.26	6	2.70	0.44
Edmonton	3	2.09	5	3.15	1.06
Calgary	2	1.50	5	3.08	1.58
Vancouver	4	2.09	9	3.35	1.26

in Halifax. Not surprisingly, given some of our other findings, the markets which receive a P.B.S. Station by cable tend to gain the most, particularly if their off-the-air choice is limited. Thus Halifax and Calgary, the market with the next biggest gain, have two off-the-air stations and cable provides the programing of three more stations, one of which is a P.B.S. station.

To test the effect of different types of stations on viewer choice an Ordinary Least Squares was run with the following variables[16]:

Dependent Variable:

X_1 = number of viewer choices (6:00 p.m. to 11:30 p.m., November 3 - 9, 1974) on All Stations (including P.B.S.) in the market.

Independent Variables:

X_2 = number of C.B.C. Owned English Stations in the market.

X_3 = number of C.B.C. Owned French Stations in the market.

X_4 = number of C.B.C. English Affiliate Stations in the market.

X_5 = number of C.T.V. Affiliate Stations in the market.

X_6 = number of Global Stations in the market.

X_7 = number of Canadian Independent Stations in the market.

X_8 = number of U.S. Commercial Stations in the market.

X_9 = number of U.S. P.B.S. Stations in the market.

Two other independent variables were considered but omitted. C.B.C. French affiliates were omitted because there is only one such station in our markets. T.V.A. affiliates were omitted because of a very high correlation with X_3. The results are shown in Table 12.6.

TABLE 12.6: MULTIPLE REGRESSION ON VIEWER CHOICES IN 14 MARKETS.

(Regression Coefficients And Their T-Statistics)

Constant	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	R^2
138.665	21.3176	63.4286*	12.3991	-16.7862	34.0775	14.6196	11.1704**	66.9497*	.9332
	(.916)	(3.78)	(.789)	(-0.753)	(1.23)	(0.789)	(1.94)	(3.10)	

Note: * denotes significant at 1% level in a two-tailed test.
** denotes significant at 10% level in a two-tailed test.

The coefficients indicate the marginal effect on the number of viewer choices of an increase in one of this type of station when everything else is held constant.[18] With the exception of X_5, all the coefficients have the correct sign. The principal findings are the substantial effects of P.B.S. and C.B.C. Owned French Stations on viewer choice. The first finding is consistent with the results of our earlier analysis of choice. C.B.C. Owned French Stations ranked well in our analysis of balance and diversity of programing. It appears these aspects are reflected in the substantial effect of these stations on viewer choice. The coefficient for U.S. commercial stations, the only other significant result, is low, presumably reflecting a high duplication with the programing of a number of other station types. The 11.1704, however, indicates the increase in the number of viewer choices from adding one more U.S. station to the mean of 2.65; because, as more stations are added, the increments to viewer choice diminish, adding a U.S. commercial station to a market from a base of zero or one would be expected to have a greater effect than this.

12.3.3. Radio Programing Performance

The radio program data supplied by the C.R.T.C. was for a sample, which excluded C.B.C., of 103 stations. As a consequence it proved impossible to undertake any analysis of programing at the market level.

An analysis of programing by different types of station grouping is possible. One aspect of interest is whether the type of ownership of the station affects the overall balance of programing. This is examined for three groupings of stations and the results reported in Table 12.7. All the stations included are in one of our sixteen markets and the proportions shown apply to the period September 29, 1974, to September 27, 1975. The most noteworthy result is the substantially lower Aggregate Proportion of Information offered by the stations in the broadcasting group.

TABLE 12.7: PROGRAM BALANCE BY GROUP TYPE

Group Type	Number of Stations	Aggregate Proportions		
		Heavy Entertainment	Light Entertainment	Information
Newspaper	5	.0005	.7708	.2287
Broadcasting	26	.0361	.8168	.1472
Single	8	.0247	.7596	.2157

As we indicated in Section 12.2, the C.R.T.C. has been anxious to prevent FM stations offering programing which is indistinguishable from AM stations. To obtain evidence on the extent of their success by the period in question, the balance and diversity/generic duplication were measured for 96 AM stations and 7 FM stations. We have thus included all the AM and FM stations in the sample and a number of the stations will not be in any of our fourteen markets. The results, which again apply to the period September 29, 1974, to September 27, 1975, are shown in Table 12.8. They do give evidence of some degree of complementarity with FM providing more

Heavy Entertainment and a lot less Information. However, both FM and AM have a very substantial emphasis on Light Entertainment and high G.I. values, much higher than television.

TABLE 12.8: THE BALANCE AND DIVERSITY OF PROGRAMING BY AM AND FM STATIONS

Station Type	Number of Stations	Aggregate Proportions			G.I.
		Heavy Entertainment	Light Entertainment	Information	
AM	96	.0195	.7657	.2148	.535
FM	7	.1154	.8313	.0534	.682

12.4. Summary and Conclusion

The model developed predicted that private broadcasters would tend to provide substantial duplication and limited choice. The empirical findings support this. Of the Canadian television networks or groupings, C.B.C. Owned French Stations and C.B.C. Owned English Stations provide better balance, more diversity, and less generic duplication than the private stations. C.R.T.C. Canadian content regulations prevent private stations from acting as the pure audience maximizers envisaged by the model. We noted that C.T.V. Affiliates, Global and the Independents, appear to try and maximize, subject to the constraint, by filling a large portion of their Canadian content with Information programs and hence permitting a very high percentage of their foreign programs to be of the lucrative Light Entertainment type. In the analysis of program alternatives available at the market level, our regression results indicate that C.B.C. Owned French Stations and P.B.S. Stations from the U.S. add substantially to choice while the effect of U.S. commercial

stations is not large.

The limited analysis of radio programing indicates lower diversity and higher generic duplication than for television. There is some evidence of complementarity between the offerings of FM and AM stations.

Chapter 12 - Footnotes

1. P.O. Steiner, "Program Patterns and Preferences, and the Workability of Competition in Radio Broadcasting," Quarterly Journal of Economics, Volume 66, May 1952, pp. 194-223.

2. See, for example, B.M. Owen, Diversity and Television, Office of Telecommunications Policy, Washington D.C., August 1972.

3. Canadian Radio-Television and Telecommunications Commission, "C.R.T.C. Background Paper: The Economic Realities of Canadian Television Production," Symposium on Television Violence, Ottawa, Minister of Supply and Services, 1976, pp. 156-166.

4. See Section 6A(5) of the Television Broadcast Regulations, and Canadian Radio-Television Commission, Annual Report 1972-1973, Information Canada, Ottawa, 1973.

5. Canadian Radio-Television Commission, Annual Report 1975-1976, Minister of Supply and Services, Ottawa, 1976, p. 8.

6. See Canadian Radio-Television Commission, Annual Report 1975-1976, Minister of Supply and Services, Ottawa, 1976, p. 8.

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8. See Canadian Radio-Television Commission, Annual Report 1974-75, Information Canada, Ottawa, 1975, p. 6.

9. Canadian Radio-Television and Telecommunications Commission, F.M. Radio in Canada: A Policy to Ensure a More Varied and Comprehensive Radio Service, Information Canada, Ottawa, 1975.

10. R.R. Richwood, Private Broadcasters and Broadcasting Policy in Canada, Toronto. Unpublished Doctoral Thesis, 1971, p. 749.

11. D.M. Blank, "The Quest for Quantity and Diversity in Television Programming," American Economic Review, Vol. LVI, May 1966, pp. 448-456.

12. See Canadian Radio-Television Commission, Annual Report 1972-1973, Information Canada, Ottawa, 1973, p. 18.

13. See Canadian Radio-Television and Telecommunications Commission, F.M. Radio in Canada: A Policy to Ensure a More Varied and Comprehensive Radio Service, Information Canada, Ottawa, 1975, p. 1.

14. See Canadian Radio-Television and Telecommunications Commission, F.M. Radio in Canada: A Policy to Ensure a More Varied and Comprehensive Radio Service, Information Canada, Ottawa, 1975, p. 6.

15. H. Land and Associates, Television and the Wired City, National Association of Broadcasters, Washington, 1968.

16. See W.C. Hall Jr. and R.B.D. Bratlivala, "Market Structure and Duplication in T.V. Broadcasting," Land Economics, Volume 47, No. 4, November 1971, pp. 410.

17. This regression is similar to that undertaken by H.J. Levin, "Program Duplication, Diversity, and Effective Viewer Choices: Some Empirical Findings," American Economic Review, Volume LXI, Number 2; May 1971, pp. 81-88.

18. In evaluating the additional choices provided by different types of station, it should be borne in mind that the maximum number of viewer choices a station could add is 77, a value equal to the number of half hour time periods, 6:30 p.m. to 11:30 p.m., in a week.

12.A. Appendix: C.R.T.C. Program Categories

Schedule "A"

Rev & new SOR/71-558 24-9-71

Item	Description of Subclass	Key figures 1st digit	2nd digit	3rd digit
1	Where country of origin is:			
	(1) Canada	1		
	(2) United States	2		
	(3) United Kingdom	3		
	(4) France	4		
	(5) Other	5		
2	Where broadcast origination point is:			
	(1) Local station		1	
	(2) Other station		2	
	(3) Network		3	
3	Where composition is			
	(1) Live			1
	(2) Recording of live program—first play			2
	(3) Repeat broadcast of either subitem (1) or (2)			3
	(4) Other recorded program			4
	(5) Program lip-synchronized in Canada			5

Annexe «A»

Abrogé et remp. DORS/71-558 24 septembre 1971

Article	Sous-catégories	Chiffres-clés 1er chiffre	2e chiffre	3e chiffre
1	Lorsque le pays d'origine est l'un des pays suivants:			
	(1) Canada	1		
	(2) États-Unis	2		
	(3) Royaume-Uni	3		
	(4) France	4		
	(5) Autres	5		
2	Lorsque le point de diffusion est l'un des points suivants:			
	(1) Poste local		1	
	(2) Autre poste		2	
	(3) Réseau		3	
3	Lorsque la source est l'une des sources suivantes:			
	(1) En direct			1
	(2) Enregistrement d'une émission en direct—première diffusion			2
	(3) Reprise du sous-article (1) ou (2)			3
	(4) Autre émissions enregistrée			4
	(5) Émission dont la synchronisation labiale est faite au Canada			5

Program Categories

Rev. and new SOR/64-399 3-9-64 Eff. 1-10-64

I. *Information and Orientation:*

1. News and news commentaries including newscasts, news reviews and road, weather and market reports.

2. Community and special events including information about community activities and celebrations.

3. Public affairs including talks, discussions, interviews, editorials, addresses and documentaries.

4. Religion.

5. Education:

(a) Formal—classroom instruction in school or college;

(b) Informal—adult education, occupational guidance, hobbies.

Rev. and new SOR/64-399 3-9-64 Eff. 1-10-64

II. *Light Entertainment:*

6. Music and dance intended for background or light entertainment:

(a) Hit Parade (Palmarès);

Catégories d'émissions

Abrogé et remp. DORS/64-399 3 septembre 1964 Eff. 1-10-64

I. *Information et orientation:*

1. Nouvelles et commentaires de nouvelles, y compris émissions de nouvelles, revues d'actualité, rapport sur l'état des routes, sur les conditions météorologiques et sur les marchés.

2. Événements locaux et spéciaux, y compris information sur les activités et les célébrations locales.

3. Affaires publiques, y compris causeries, discussions, entrevues, éditoriaux, conférences et émissions documentaires.

4. Émissions d'un caractère religieux.

5. Émissions éducatives:

a) Pour les maisons d'éducation—enseignement donné dans les écoles ou les collèges;

b) Éducation populaire—éducation des adultes, conseils professionnels, passe-temps.

Abrogé et remp. DORS/64-399 3 septembre 1964 Eff. 1-10-64

II. *Émissions récréatives:*

6. Musique et danse d'accompagnement ou de divertissement:

a) *Hit Parade* (Palmarès);

(*b*) Popular and dance music other than hit parade including folk, western, country dance and band music.

7. Drama, story and light verse, including serial and situation drama or story presentation, adventure and suspense drama, tales and readings and motion pictures intended as light entertainment.

8. Quiz and games.

9. Variety (revue) and music hall.

Rev. and new SOR/64-399 3-9-64 Eff. 1-10-64

III. *Arts, Letters, and Sciences:*

General—Program of recognized classics of earlier generations and contemporary achievements exceptionally distinguished in conception or performance that come within any category of programs set out in any of items 10 to 13.

10. Music and dance programs including classical, symphony, opera, choral recital and ballet programs, and interpretative dance music, experimental jazz and music hall, except programs of popular music intended primarily for background or light entertainment.

11. Drama, poem and story programs of exceptional distinction including masterpieces from various cultures and selected contemporary productions.

12. Critical evaluation in arts, literature and public affairs.

13. Science including programs aimed at clarification of scientific principles or interpretation of scientific exploration and discovery.

Rev. and new SOR/64-399 3-9-64 Eff. 1-10-64

IV. *Sports and Outdoors:*

14. Sports and outdoors—sportscasts, reviews and descriptions of all indoor and outdoor, land, water and air sports and exercises, including major sporting events like hockey, football, skiing, baseball and golf and such sports as track and field, hunting, fishing, boating, climbing, camping, gliding, motor races and rallies, bowling and curling.

b) Musique populaire et musique de danse autre que le «*hit parade*», y compris folklore, musique genre «western», musique de danse paysanne et musique d'orchestre populaire.

7. Théâtre, récits et poésie légère, y compris les pièces à épisodes, le théâtre de mœurs ou présentation d'un récit, le théâtre d'aventures, le théâtre «suspense», les contes, les lectures et les films considérés comme divertissements.

8. Jeux et questionnaires.

9. Variétés (revues) et music-hall.

Abrogé et remp. DORS/64-399 3 septembre 1964 Eff. 1-10-64

III. *Arts, lettres et sciences:*

En général, émissions qui traitent des auteurs classiques reconnus des générations précédentes et d'événements contemporains de caractère exceptionnel dans la formule et la présentation et qui entrent dans une des catégories décrites dans les articles 10 à 13.

10. Émissions de musique et de danse, y compris musique classique, symphonies, opéras, récitals de chorale et programmes de ballet, musique de danse figurative, jazz expérimental et music-hall, excepté les programmes de musique populaire considérés principalement comme accompagnement ou divertissements.

11. Programmes traitant d'œuvres dramatiques, de poèmes et de récits d'un caractère exceptionnellement élevé, y compris des chefs-d'œuvre et différentes cultures et des œuvres contemporains choisies.

12. Critique d'œuvres littéraires, artistiques et des affaires publiques.

13. Science, y compris les émissions visant à l'explication des principes scientifiques ou à l'interprétation des explorations et des découvertes scientifiques.

Abrogé et remp. DORS/64-399 3 septembre 1964 Eff. 1-10-70

IV. *Sports et vie en plein air:*

14. Sports et vie en plein air—émissions sportives, reportages d'épreuves sportives et description et description de tous les sports et exercices d'intérieur et d'extérieur, terrestres, aquatiques et aériens, y compris les grandes épreuves sportives comme le hockey, le football, le ski, le base-ball, le golf et les sports tels que piste et pelouse, chasse, pêche, canotage, alpinisme, camping, vol à voiles, course d'automobiles et «rallyes», quilles et curling.

13. The Cable-Television Industry

Community Antenna Television (CATV) has grown dramatically. As of 1975, there were 388 cable systems operating ranging in size from a few hundred subscribers to over two hundred thousand.

The study of the cable industry is important for a number of reasons. First and foremost it represents an information dissemination medium which may have a significant impact on the market power of broadcasting companies. Cable systems take, currently at a zero charge, broadcast signals from television stations too distant to be received by local consumers, amplify the signals and distribute them through cable. The effect is to increase the broadcasters audience size and thus affect the advertising rate of the station. If cable systems, exclude some stations for distribution through their system, they may increase the relative market power and profitability of those stations which they do re-broadcast. Second, there arises the question of compensation to broadcasters and artists for the inputs which the cable system utilizes. One may argue that the broadcast signal has public good characteristics. With a marginal cost of zero the price paid for the input should also be zero. However, this is a short run view in that failure to compensate a factor of production - program producers - may result in fewer and/or lower quality programs over the long run. Therefore, the price paid to broadcasting or artists should reflect the long run marginal cost. A third area of interest concerns the effect of cable on the profitability of broadcasters, since audience size is increased and therefore advertising rates increase. With no corresponding increase on the cost side, profits of broadcasting station increase. In this case, any cross-ownership between broadcasting and cable systems, may result in increased profits; the profits represent

rents from the licences which the cable system obtains.

Finally, since the cable industry is regulated on both entry and price, the question arises of the need for regulation and if so the most appropriate form. This issue requires investigation of the price and demand equation, a cost function to determine the nature and extent of economies of scale as well as economies of density, and the estimation of a profit equation.

This chapter provides an overview of the structure of the CATV industry in Canada. The purpose is to characterize and estimate the principal relationships: demand, price cost, and profit equations. These estimates can then be utilized to measure the nature and extent of both economies of scale and economies of density, and the profit equation will provide information of how profits vary over firm and market size. This analysis is a first stage by which one may then evaluate regulatory policies. It also serves as a take-off point to examine the magnitude of rents associated with restrictive entry, whether the industry has the economic characteristics for a regulated industry and whether cross-ownership has a perceptible influence on costs and profits in either medium.

Section 13.1 provides an overview of the CATV system including subscriber, financial and operating characteristics. Section 13.2 describes the demand and price relationship and the estimation. A cost analysis is presented in section 13.3 together with the profit equations. Analysis and a summary are contained in section 13.4.

13.1 An overview of CATV

Although the growth of CATV has been high over the last decade, it has not been equally distributed across the provinces. Table 13.1 gives the distribution of systems over provinces in 1975. An indication of

TABLE 13.1

CABLE-TELEVISION SYSTEMS IN CANADA BY PROVINCE

Province	Operating Systems	Number of Subscribers
Nfld.	1	325
P.E.I.	0	0
N.S.	10	52,247
N.B.	12	33,483
Que.	146	510,540
Ont.	118	136,397
Man.	6	124,319
Sask.	7	11,243
Alta.	20	206,474
B.C.	68	560,909

SOURCE: Statistics Canada Cat. 56-205 (1975)

the resources available to and controlled by CATV, is presented in tables 13.2, 13.3 and 13.4. These tables clearly indicate that the largest companies (measured by number of subscribers) do not have significantly more miles of cable. The explanation lies in the economies of density with the firms being licenced in the highest density markets. We can see for example, in table 13.2 and 13.3, that the largest five companies have significantly more indirect subscribers, that ratio of indirect to direct sub-

scribers falls as firm size falls and that the largest firms have the highest percentage of total indirect subscribers.

Tables 13.5, 13.6 and 13.7 present the financial and income characteristics of the size grouping of CATV companies. The figures suggest that the largest companies are more profitable than smaller firms. The figures, however, are misleading since CATV operators are licenced for specific markets by the CRTC and their market power is in reference to the signal area and not the national market to which the table figures refer. The ability of larger firms to be more profitable may result from larger markets, more dense markets - thereby achieving density economies - or having substantial market power. One thing is clear however; the CATV firm are highly profitable with an average rate of return of 24 percent.

The principal reason for the above average rate of return is the licencing restrictions imposed by the CRTC. In reviewing the various proclamations made by the CRTC regarding CATV operations, one can see the protectionist evolution. As Babe (1975) notes, initially the CRTC had neither an awareness of nor concern for the impact of CATV on broadcasting. However, once the effect of CATV on Canadian content and market fragmentation became clear, the CRTC became highly protectionist; primarily on Canadian content grounds, and partially on the basis of destructive competion.[1] With the rapidly changing technology which made effective regulation of this policy infeasible, the CRTC switched from a short run protectionist stance of restricting CATV to one of complementing cable resources with those of broadcasting in an attempt to improve the perfor-

mance of the latter.[2]

The attitudes demonstrated by CRTC regulation and its performance in light of Communication policy suggest a close look at the demand and cost relationships in the cable television industry in Canada. These relationships provide the information on the validity of systems in particular areas and the optimal number or size of system which should be licenced. This information can then be used to evaluate, albeit in a later study, the effects of cable on audience fragmentation, Canadian content and the profitability of braodcasting.

13.2 Demand relationships

The demand for cable may be viewed similar to that of any economic good; that is, it is a function of its own price, the price of substitutes and income. Previous work by Park[3] and Good[4] have centered on the penetration rate (the ratio of subscribers to dwelling units passed by cable) as the measure of demand. Park's characterization in terms of a non-linear demand model was followed by Good. However, the latter failed to take account of the non-linear specification and the bounded dependent variable problem, and his estimates are therefore unreliable.

Rather than use the penetration rate, this study used total subscribers as the measure of demand. This characterization allows one to evaluate the effects of market size as well as the traditional variables. One difficulty with both this and the penetration rate, is it fails to segment direct and indirect subscribers. The former basically refer to

TABLE 13.2

SUBSCRIBER AND OTHER OPERATING CHARACTERISTICS OF CANADA'S LARGEST CABLE TELEVISION COMPANIES - 1976

	Largest 5 Companies (1 - 5)	*Second Largest 5 Companies (6 - 10)*	*Third Largest 5 Companies (11 - 15)*	*Fourth Largest 5 Companies (16 - 20)*	*Fifth Largest 5 Companies (21 - 25)*	*Sixth Largest 5 Companies (26 - 30)*	*All Remaining Companies (31 - 188)**	*All Companies (1 - 188)**
Total Subscribers (000's)	1 019	514	278	217	132	104	802	3 086
Direct Subscribers (000's)	795	331	219	185	115	86	710	2 441
Indirect Subscribers (000's)	224	183	58	33	37	17	92	644
Total Households Offered Cable Service (000's)	1 678	687	374	350	199	158	1 172	4 618
Total Households in Licensed Areas (000's)	1 715	696	386	403	202	161	1 320	4 883
Strand Miles of Distribution Cable	6 925	3 496	2 192	2 026	1 114	912	10 942	27 607
Strand Miles of Main or Trunk Cable	2 017	992	661	627	451	300	3 218	8 266
Average Size of Company (No. of Subscribers per Company (000's)	204	103	56	43	30	21	5	16
Number of Employees	1 402	709	318	330	231	133	1 925	5 048

*Excludes those licensees having less than 1000 subscribers.
The latter excluded group has only 2% of total subscribers.

SOURCE: Department of Communications, Statistical Information Services

TABLE 13.3

SUBSCRIBER AND OTHER OPERATING CHARACTERISTICS OF CANADA'S LARGEST CABLE TELEVISION COMPANIES - COEFFICIENTS - 1976

	Largest 5 Companies (1 - 5)	*Second Largest 5 Companies (6 - 10)*	*Third Largest 5 Companies (11 - 15)*	*Fourth Largest 5 Companies (16 - 20)*	*Fifth Largest 5 Companies (21 - 25)*	*Sixth Largest 5 Companies (26 - 30)*	*All Remaining Companies (31 - 188)**	*All Companies (1 - 188)**
Indirect Subscribers Proportion (Indirect Subscribers Divided by Total Subscribers) (%)	22.0	35.7	21.0	15.0	24.3	16.8	11.5	20.8
Penetration Ratios (%)								
a) Subscriber Utilization of Cable (Number of subscribers divided by number of households offered service)	60.7	74.8	74.3	62.1	76.2	65.7	68.4	66.8
b) Household Penetration (Number of subscribers relative to number of households in licensed areas)	59.4	73.9	72.3	53.8	75.2	64.6	60.8	63.2
c) Cable Penetration (Number of households offered service relative to number of households in licensed areas)	97.8	98.7	96.9	86.8	98.5	98.1	88.8	94.6
Distribution Cable per Thousand Subscribers	6.8	6.8	7.9	9.3	7.3	8.8	13.6	8.9
Trunk Cable per Thousand Subscribers	2.0	1.9	2.4	2.9	3.0	2.9	4.0	2.7
Number of Employees per Thousand Subscribers	1.4	1.4	1.1	1.5	1.5	1.3	2.4	1.6

*Excludes those licensees having less than 1000 subscribers. The latter excluded group has only 2% of total subscribers.

SOURCE: Department of Communications, Statistical Information Services

TABLE 13.4

SUBSCRIBER AND OTHER OPERATING CHARACTERISTICS OF CANADA'S LARGEST CABLE TELEVISION COMPANIES - 1976

	Largest 5 Companies (1 - 5)	*Largest 10 Companies (1 - 10)*	*Largest 15 Companies (1 - 15)*	*Largest 20 Companies (1 - 20)*	*Largest 25 Companies (1 - 25)*	*Largest 30 Companies (1 - 30)*	*All Companies (1 - 188)*
Total Subscribers - Value (000's)	1 019	1 533	1 811	2 028	2 180	2 284	3 086
- % to Total	33.0	49.7	58.7	65.7	70.6	74.0	100.0
Direct Subscribers - Value (000's)	795	1 126	1 345	1 530	1 645	1 731	2 441
- % to Total	32.6	46.1	55.1	62.7	67.4	70.9	100.0
Indirect Subscribers - Value (000's)	224	407	465	498	535	552	644
- % to Total	34.8	63.2	72.2	77.3	83.1	85.7	100.0
Total Households Offered Cable Service - Value (000's)	1 678	2 365	2 739	3 089	3 288	3 446	4 618
- % to Total	36.3	51.2	59.3	66.9	71.2	74.6	100.0
Total Households in Licensed Area - Value (000's)	1 715	2 411	2 797	3 200	3 402	3 563	4 883
- % to Total	35.1	49.4	57.3	65.5	69.7	73.0	100.0
Strand Miles of Distribution Cable - Value	6 925	10 421	12 613	14 639	15 753	16 665	27 607
- % to Total	25.1	37.7	45.7	53.0	57.1	60.4	100.0
Strand Miles of Main or Trunk Cable - Value	2 017	3 009	3 670	4 297	4 748	5 048	8 266
- % to Total	24.4	36.4	44.4	52.0	57.4	61.1	100.0
Number of Employees - Value	1 402	2 111	2 429	2 759	2 990	3 123	5 048
- % to Total	27.8	41.8	48.1	54.7	59.2	61.9	100.0

*Excludes those licensees having less than 1000 subscribers.
The latter excluded group has only 2% of total subscribers.

SOURCE: Department of Communications, Statistical Information Services

single family dwellings while the latter refer to large blocks of units such as apartment buildings. Since the average charge per subscriber will be influenced by the costs of servicing and costs vary between these two different types of units and thereby the change, some information is lost by failing to segment subscribers and using the average charge per subscriber.

The exogenous variables were the average charge per subscriber, (x_1) the average income of the area in which the station is located (x_2), the population of the area (x_3), the amount spent on local programming (x_4) and the age of the system (x_5). Two variables which are not included and should be are: the net addition of network and non-network stations. Individuals demand cable because among other things, it offers a greater variety of programs from which to choose. Since these variables are excluded the estimates will be biased.

As Good points out, the model is clearly simultaneous; the number of subscribers is a function of price, price is a function of cost and cost is a function of the number of subscribers. Initial estimates were made using ordinary least squares, but the simultanity characteristic requires the use of instrumental variables to provide consistent estimates.

The data for both the demand and cost analysis were provided by the Department of Communication. Individual firm data was augmented by Statistics Canada data and data from Urban Affairs. The sample consists of 175 individual firm. These were selected by excluding all firms with less than 1000 subscribers since complete financial data were not available for these firms, and, excluding group owned firm where the balance sheet was a consolidated statement for all firms.

Estimates of the demand and price equations are contained in table 13.7. All signs are as expected. The variables included consist of those which economic theory would suggest as well as 'quasi-regulated' variables. This latter group of variables, Good[6] suggests should be included since prices are regulated by the CRTC and prices are explained in part by variables which the CRTC considers important.

The evidence from the demand equations suggests that rates may be at their profit maximizing levels since firms are operating on the elastic portion of the demand curve. The calculated price elasticity averages 1.1 for the demand equations. This measure is upward biased since the variables capturing the net additional signals with cable have been omitted from the estimated equations.

Good[7] claims firms are operating on the inelastic portion of the demand curves but one questions this since the dependent variable is the penetration rate. What he has estimated is a share equation with some peculiar properties; for example, if the firm increases its size the penetration rate falls.

In the price equations, there is evidence that rates fall with the age of the system and with the penetration rate. The latter variable operates through two mechanisms. First, as the penetration rate increases, fixed costs are spread over more units of output, and second, the penetration rate is similar to a 'load factor' and as the load factor increases the cost curve shifts downward.[8]

The local programming costs are positive in both equations. This variable represents the CRTC's emphasis on service and its willingness to allow higher rates with greater local programming content.

TABLE 13.8

OLSQ AND INSTRUMENTAL VARIABLES ESTIMATES OF DEMAND AND PRICE EQUATIONS FOR CABLE-TELEVISION

	CONSTANT	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	R^2
1.	17388.1 (1.93)	-3872.23 (-3.62)	.459 (2.47)	.005 (2.51)	.3867 (8.5)					2965.6 (.70)	.78
2.	10,482.5 (1.02)	-3339.4 (-3.11)	.3927 (I.41)	.005 (2.83)	.3836 (8.41)	480.1 (1.73)					.79
3.	11,695.7 (2.24)	-9125.7 (-3.26)	1.789 (1.47)	.004 (1.77)	.398 (6.89)	157.3 (1.47)					
4.	2.93 (4.96)		.0002 (3.05)		.00002 (1.13)	-.0268 (1.48)	.0211 (5.77)		-.0006 (1.03)		.21
5.	2.82 (4.81)		.0002 (3.07)		.00002 (1.81)	-.0254 (-1.42)	.022 (6.21)				.27
6.	2.74 (3.88)		.0002 (3.06)		.00002 (1.82)	-.0263 (-1.41)	.022 (6.17)	-.095 (-2.20)			.37
7.	4.31 (5.86)		.0002 (2.61)		.00002 (.536)	-.047 (-2.38)	.007 (2.24)	-.382 (-1.79)			.34
8.	3.89 (5.42)		.0002 (3.42)		.00001 (1.36)	-.046 (-2.35)	-.008 (-3.23)				.30

X_1 = Average charge per subscriber

X_2 = Average income of market

X_3 = Population

X_4 = Amount spent on local programming

X_5 = Age of the system

X_6 = Average cost

X_7 = Penetration rate

X_8 = Miles of cable in system

X_9 = Microwave dummy variable

NOTES: · statistics are in parenthesis
sample size = 175
equation 1, 2, 3 are demand equation with total subscribers as the dependent variable. Equation 1 and 2 were estimated using ordinary least squares, equation 3 with instrumental variable.
equations 4-8 are price equations. Eg. 4-6 were estimated using ordinary least squares, equation 7 and 8 with instrumental variables.

Section 13.3 Cost Relationships in the Cable Industry

As Babe[9] has noted, the study of cost relationships is important for at least three reasons. First, the granting of licences (free) within urban areas on a fragmented basis makes sense only if the economies of scale are not large and the economies of density are; on efficiency grounds. Second, industries regulated via entry regulation (exclusive licences) should, on economic grounds, possess specific cost characteristics; increasing returns to scale. Also, economic waste from duplication may also be evaluated.[10] Third, the cost relationships with respect to scale and density provide some conclusions regarding the feasibility of extending cable service to rural areas.

The cost functions estimated below are part of the simultaneous system of equations presented earlier. Good[11] presents estimates of costs for cable. He segments the costs into operating and fixed costs and estimates two equations. From the fixed cost equation he attempts to evaluate the degree of economies of scale and from the operating cost function he purports to examine economies of density. The difficulty is that in neither case has he held the alternative variable constant so one is still not clear what the economies of density are, holding firm size constant. An added difficulty arises in his specification of the fixed cost equation in which he fails to segment miles of cable into above and below ground. This is important since the cost of aboue ground cable is approximately $4000/mile and below ground cable is approximately $13,000 per mile in 1975.

For example, Good estimates an equation of the form:

$$D = d + B_1 M + P_2 M^2 + P_3 M^3$$

where D is depreciation and M is miles is miles of cable. Estimates of this equation with and without segmenting cable into above ground (Ma) and below ground M_B were

$$\underset{}{\text{Dep.}} = \underset{(.384)}{7638.69} + \underset{(2.89)}{539.1M} + \underset{(3.93)}{1.19M^2} - \underset{(-4.03)}{.0004M^3} \quad R^2 = .83$$

and

$$\underset{}{\text{Dep.}} = \underset{(.609)}{10{,}500} + \underset{(0.824)}{199.9Ma} + \underset{(3.02)}{2387.4M_B} + \underset{(1.99)}{.989Ma^2} + \underset{(2.46)}{13.71M_B^2}$$

$$- \underset{(-1.01)}{.002Ma^3} - \underset{(-4.46)}{.044M_B^3} \qquad R^2 = .90$$

These estimates clearly indicate that the optimal size of plant, measured in cable miles, is much smaller for a firm which employs below ground cable than one employing above ground cable. Cable system in urban areas utilize more below than above ground and their plants tend to be smaller than rural systems. But the optimal mix is not independent of the density of subscribers and one must insure that economies of scale for plants are evaluated for a given density since the cost function shifts with changes in density.

In this study, rather than separate the two costs and estimate separate regressions, we estimate a total cost function in an attempt to evaluate economies of scale and ecomonies of density in terms of percent variable. Percent variable (P.V) is simply the ratio of marginal costs to average cost; PV < 1 implies increasing returns, PV > 1 implies decreasing returns and PV = 1 implies constant returns. It is a measure of the elasticity of cost with respect to a change in output. The percent variable concept is a particularly helpful summary measure but one which must be carefully utilized. As Griliches[12] points out, percent variable

is 'variable' in that it does not remain the same at different levels of output. In our case, the percent variable must be evaluated for a given output and for a given density.

In specifying the cost-output relationship, a problem of deflation by size arises. One wishes to deflate to minimize the influence of extremely large observations. As Griliches notes, "Implicitily, it is assured that the larger the observation, the larger is the error associated with it, and that by dividing them by a size measure one gets numbers whose errors are roughly comparable to each other, that is, deflation is performed to stabilize the error variance".[13] In order to take account of the size influence, one may either deflate by a size variable or utilize a variance stabilizing transformation such as logarithms.

We selected to deflate by size. The measure selected was the miles of cable in the system. This measure assumes that the cost relationship specified is homogeneous in output and size or that there are no costs which are independent of size. Again Griliches[14] provides a good illustration of the implications of the homogeneity assumption. Consider the following specification.

$$C = \alpha m + ps \tag{1}$$

where c are the costs, m represents the miles of cable and s, the number of subscribers, is an output measure. Dividing the above equation by m to deflate, we obtain

$$\frac{c}{m} = \alpha + p\,\frac{s}{m} \tag{2}$$

However, the true relationship may be

$$c = \alpha m + ps + \gamma \tag{3}$$

and deflating by m, one obtains

$$\frac{c}{m} = \alpha + \beta\left(\frac{x}{m}\right) + \frac{\gamma}{m} \qquad (4)$$

If one uses the specification in (2), the implicit assumption is that γ of (4) is not statistically significantly different from zero. Estimates of equation 2 and 4 are

$$c/m = \underset{}{506.28} + \underset{(2.62)}{34.42}(s/m) + \underset{(13.14)}{25747.2}(1/m) \qquad 4'$$
$$\underset{(7.49)}{} \qquad R^2 = .71$$

and

$$c/m = \underset{}{298.36} + \underset{(1.35)}{44.33}(s/m) \qquad 2'$$
$$\underset{(17.06)}{} \qquad R^2 = .62$$

and

$$c = \underset{}{32660.4} + \underset{(1.34)}{654.07}\,M + \underset{(3.67)}{31.49}\,S \qquad 5$$
$$\underset{(19.14)}{} \qquad R^2 = .95$$

with a significant coefficient γ in 4' and significant coefficients in 2' and 5. The assumptions underlying the size deflater are not contradicted.

A number of alternative cost function were estimated using both ordinary least squares and the instrumental variable procedure. The latter was required since we have a simultaneous system as discussed earlier. The estimates are presented in table 13.8.

Babe[15] has argued that cable systems are subject to strong diseconomies of scale. The diseconomies result from two sources; first, there is a limit in the distribution systems if one wishes to maintain a signal at a given quality. That is, the total length of trunk cable from the head end is limited since the method utilized in transmitting the signal rely on amplifiers at various points along the cable and these amplifiers, amplify both extraneous noise and the signal. Babe notes, "at the very maximums, seventy-five amplifier have been vascaded, giving 30 miles of trunk cable, but normally a maximum of seventeen trunk miles is placed on systems length in order to maintain high standards".[16] The second factor, contributing to diseconomies, is the

TABLE 13.9

ESTIMATES OF COST FUNCTIONS FOR CABLE-TELEVISION

EQUATION NUMBER AND DEPENDENT VARIABLE	CONSTANT	M	S	P	$\frac{S}{M}$	$\frac{1}{M}$	lnM	lnS	lnP	AGC	R^2
1. Operating costs	10978.7 (1.04)	-242.17 (-3.14)	-9.414 (-13.24)								.90
2. Total costs	32660.4 (1.34)	654.07 (3.67)	31.49 (19.14)								.95
3. Total costs	285253 (3.02)	483.7 (2.61)	32.76 (19.52)	-324244 (-2.77)							.95
4. Total cost per mile	506.28 (2.62)				34.41 (13.14)	25747.2 (7.49)					.72
5. Total cost per mile	1113.68 (2.59)			-876.65 (-1.58)	34.88 (13.28)	26308.9 (7.65)					.73
6. Log of total costs	5.09 (23.35)						.8984 (1.76)	.807 (16.03)			.93
7. Log of total costs	4.81 (18.63)						-.894 (-10.98)	1.87 (4.58)	-.846 (-5.39)		.94
8. Total costs per mile	964.5 (3.33)				35.09 (13.42)	25356.7 (7.44)				-49.65 (-2.11)	.73

where m = miles of cable
s = number of subscribers
p = penetration rate

NOTE: equation 7, 8 was estimated utilizing instrumental variables
to statistics are in parenthesis

channel capacity of the trunk cable. Until recently with technological change, a maximum of twelve channels could be carried. There also exists some casual empiricism of few economies of scale, in that the large cable systems in large urban areas employ multiple head end sites; that is, are basically multi-plant firms.

The evidence presented in table 13.8 suggests that total systems costs decrease with the age of the system. This result can be explained by the positive correlation between the penetration rate and age; older systems have achieved a higher penetration rate and there appears to be economies of density in that costs fall with increasing penetration. More will be discussed below.

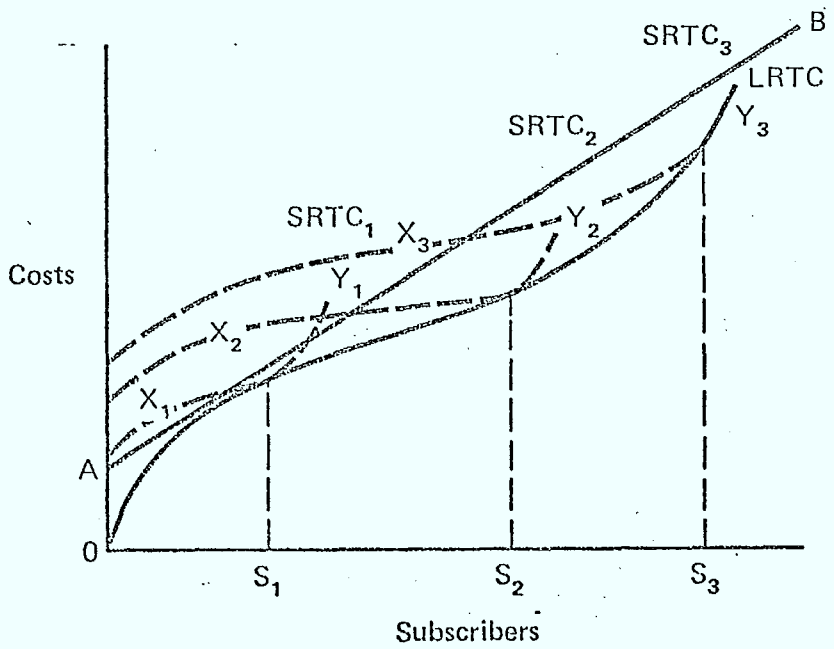
Evidence in both Babe[17] and Good[18] suggests substantial decreasing returns to scale in cable systems. Babe argues that plants of up to 200 miles, operating costs fall, but on a total cost basis, systems of less than 100 miles and greater than 600 miles face high costs. Good on the other hand states that average total cost per cable mile is of a minimum for systems of 70 miles. The difficulty with these results is that they fail to take account of the shifting of the average cost function with either increases or decreases in the penetration rate.

From the estimates of table 13.8, the percent variable measure, is calculated to be approximately .89 to .91. Since this value is less than one, it implies increasing returns to scale where scale is measured in miles of plant. This is opposite to the evidence of Babe and Good. A possible explanation is that first, we have not estimated a long run cost function which is the traditional interpretation from a cross-sectional analysis. The evidence for this is that the constant term in all regressions is significant. Second, because the sample has not been

segmented into various size classes, we have two counteracting phenomena working. First, the small firms are on the downward sloping portion of their average cost curve and thus exhibit increasing returns, while at the same time because of their predominately rural nature, they have low densities (subscribers/mile) and they are not achieving the reduced costs. On the other hand, large firms are operating on the decreasing returns portion of their cost function but these firms are those achieving economies of density and have low levels of cost functions because of high penetration rates. What may be happening is that the small firm influence outweights the large firm influence and thus the average firm exhibits increasing return. Indeed, the sample mean for miles of plant is 184.85 and following Babe this should generate the result we have.

Equations 7 and 8, the logarithic form, suggest increasing returns with a percent variable of .89 which implies some excess capacity and substantial returns to traffic density. To see what is going on, consider figure 13.1. Points S_1, S_2 and S_3 represent optimum levels of output.

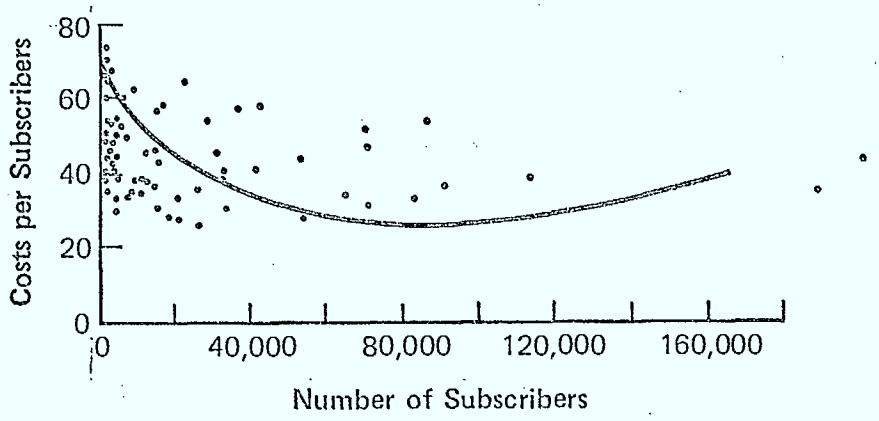
Figure 13.1 Actual and Estimated Cost Functions over Alternative Sizes of Firms



If small firms have excess capacity, they will not be on the long run cost function but will be to the left on the short run cost function such as points X_1, X_2 and X_3 (since each short run cruve corresponds to a firm of a given milage). On the other hand the large firm will be to the right of the optimal point. Such as point Y_1, Y_2 and Y_3. The estimated regression line may then be AB, with a greater than 45° slope from the origin and therebygenerate a percent variable measure <.1. Similar reasoning holds for the economies of density.

A significant problem which does arise in the interpretation of all of the cost function is the extent to which we are estimating points on different cost function for alternative penetration rates. Figures 13.2 and 13.3 provide a pictorial representation of the shape of the average

Figure 13.2 Estimated Average Costs



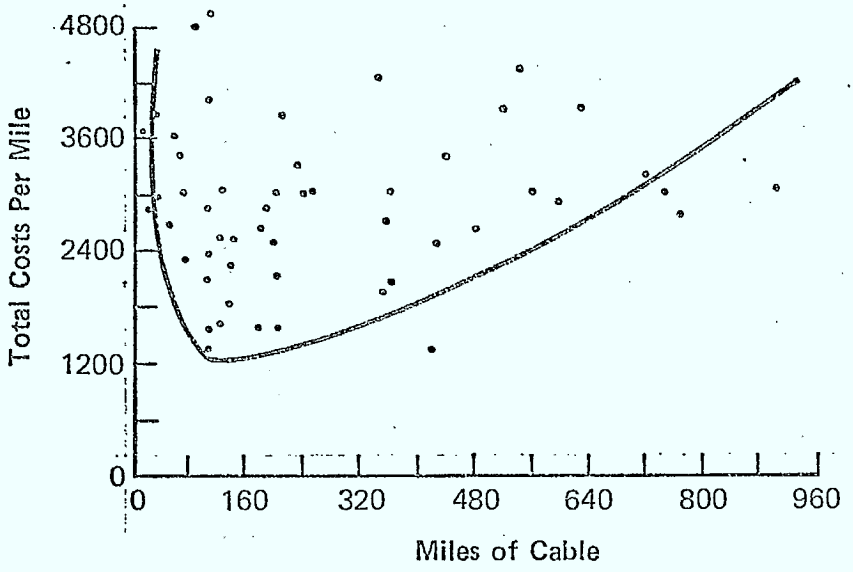
cost curves with respect to scale and output (subscribers).

Figure 13.2 shows that average total costs are lowest at approximately 66,000 subscribers. This is of course ignoring the effects of the penetration rate on shifting the cost curve. These results, it should

be noted are in very close agreement with Good.[19]

Figure 13.4 illustrates the cost per mile against miles where miles is

Figure 13.3 Average Costs With Respect to Firm Size



a measure of size. The results of both the cost equations and the graphical illustration suggests that economies of firm size are exhausted quickly and that longer firms are at a disadvantage. The optimum firm size was found to be approximately 100 miles of cable.

An examination of the average total costs per subscriber under alternative penetration rates was made. At low penetration (.3) rates the costs were approximately $50 per subscriber, at medium penetration rates (.3-.6) the average cost falls to approximately $42 per subscriber and at high penetration rates (>.67) the figure is approximately $39 per subscriber.

Babe found that the fixed investment per potential subscriber for low penetration systems is $25 - $28 and for highly penetrated systems,

which are also large systems the costs average $25 - $40 per potential subscriber.[20] Our figures reflect the economies of density and economies of scale.

The shifting of the cost curve with penetration rates is nothing more than the phenomena of capacity utilization. In airlines, the 'load factor' is comparable to the penetration rate. Keeler finds that the cost function and therefore the price per passenger falls as the land factor increases.[21] One may therefore calculate the average cost per home and compare this cost - which assumes a penetration rate equal to 1 - to costs at lower penetration rates. From this one can obtain a feel for the price change as average cost falls. Indeed, the high profitability of cable firms may be explained by this phenomena since the average penetration rate over the sample is .74. At a penetration rate of 1, the average cost per subscriber is approximately $37.00, thus a price of $3.08 per month would yield total revenue to cover total cost. At the average penetration rate of .74, the average cost per subscriber rises to $50 which requires a price of $4.16 per month to generate sufficient revenues. The existing average price for cable is justified only if the penetration rate is approximately 55%.

A profit equation was also estimated for the sample of 175 cable operations. Two alternative definitions were used. One was the rate of return on equity defined as revenue before taxes, depreciation and interest over the sum of common, preferred and earned surplus. The second measure was the price-cost margin. The estimates are contained below.

$$\underset{}{P\text{-}C} = \underset{}{.2557} + \underset{(3.30)}{.0023Y} + \underset{(.889)}{.0002M} + \underset{(3.44)}{.0003HPM} + \underset{(.858)}{.091PeN} + \underset{(1.51)}{.308AGE} \qquad R^2 = .12$$

$$\underset{}{ROR} = \underset{}{3.29} + \underset{(3.57)}{.0019Y} + \underset{(.423)}{.0017M} + \underset{(2.73)}{.00002POP} + \underset{(1.15)}{1.87PeN} + \underset{(3.03)}{.317AGE} \qquad R^2 = .16$$

where P-C is the price-cost margin, ROR is the profit measured by rate of return, Y is income, m is miles of cable, PEN is the penetration rate, HPM is the homes per mile of cable, POP is the population of the market.

The results are clearly weak. One of the principle reasons is the weakness in some of the data and the failure to include some crucial variables. Despite these limitations, there still remain some interesting interpretations. First, cable firms are licenced by the CRTC and this licence represents an entry barrier which substantially reduces competition. As a result of the reduced competition, the firm is able to earn above normal profits, all or part of which are rents attributable to the artificial barrier. The constant term in the equation has the interpretation of, 'this is the value of the dependent variables if all other explanatory variable are zero'. Therefore, one may interpret the constant term as relecting the value or profitability attributable only to the licence. In order to obtain a true measure, one would have to estimate profit equations for cable firms and for other types of industries in Canada and take the difference between the constant terms of the two equations. This will, if the other industries are competitive having no rents to artificial barriers which would be reflected in their constant terms, provide an estimate of the rents to the licence. Also, one would not expect, under competitive condition, the constant term of the non-cable regressions to be statistically significant. For example, in the ROR equation above, one might argue that 3.29 percent of the profits are represented by rents to the licence.

The second important point which arises is the high average profitability of cable firm. The average rate of return in the sample was 24%; a value more than double the market return. A survey of the cost equation, indicates that the marginal cost is approximately $35.00 per subscriber.

However, the average rate per subscriber is $64.00 per year. The price is almost twice the marginal cost, reflecting the price monopoly power of the cable firms. This result is not surprising since the CRTC does not regulate on the rate of return and as one intrepreter has described it, 'a licence in cable, is a licence to print money'. Now consider if prices were forced down to reflect marginal costs. Recalling from the demand equation that the price elasticity of demand is approximately equal to 1, one would then find no change in total revenues. If there are some minor returns to scale, costs will fall slightly and profits would increase. Alternatively, if there existed decreasing returns at the plant level, one should observe more plants (systems) in the industry. The distribution of effects of such a pricing change would depend on the existing penetration rate and the size of the firm.

The size of the market and size of the firm also have positive effects on the profit rate; larger firms in larger markets are more profitable. The variable which has the largest effect of increasing profits is the penetration rate. As we have seen, costs per subscriber fall with increases in penetration.

13.4 Summary and Conclusions

In summary, cable firm are quite profitable earning an average a rate of return of 24%. The industry is characterized by a cost function which quickly exhausts all economies of scale. However, the economies of density are substantial. The optimal number of firms is therefore a function of the expected penetration rate of these firms.

Having characterized the demand and supply sides of cable, what

remains is toutilize this information to determine the value of licences according to firm, market and ownership. Also, the compensation to either broadcasters or artists for the use of inputs must also be determined and the effects of alternative compensation schemes on the number and size distribution of firms as well as their profitability.

CHAPTER 13

FOOTNOTES

1. As we have noted above, these arguments are certainly not convincing since CATV may have increased the profitability of some broadcasting operations.

2. For a discussion of this, as well as the audience fragmentation effects of cable see Babe (1975).

3. R.E. Park, (1972), "Prospects In Cable in the 100 Largest Television Markets" Bell Journal of Economics and Management Science, Vol. 3, No. 1. pp. 130-150.

4. L. Good, (1975), An Econometric Model of the Canadian Cable Television Industry and the Effects of CRTC Regulation (paper presented at the Canadian Economics Association Meetings, June 1975).

5. Ibid.

6. Ibid.

7. L.M. Good, An Econometric Model of the Canadian Cable Television Industry and the Effects of CRTC Regulation, unpublished manuscript based on Ph.D. thesis, University of Western Ontario, 1974.

8. R.E. Babe, (1975), Cable Television and Telecommunications in Canada, M.S.U. International Business and Economic Studies, Michigan State University.

9. Ibid.

10. Babe, op.cit., suggests this waste can be determined from comparisons of capital invested per subscriber.

11. L. Good, 1974, op.cit.

12. Z. Griliches, "Cost Allocation in Railroad Regulation," Bell Journal of Economics and Management Science, Spring 1972, Vol. III, No. 1, pp. 26-42.

13. Ibid.

14. Ibid.

15. R.E. Babe, op.cit.

16. Ibid.

17. Ibid., p.30.

18. L. Good, 1974, op. cit.

FOOTNOTES (continued)

19. L. Good, 1975, op. cit.

20. R.E. Babe, op.cit.

21. T.E. Keeler, (1972) "Airline Regulation and Market Performance" Bell Journal of Economics and Management Science Vol. 3, No.2 pp. 399-425

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14. SUMMARY AND CONCLUSION

The focus of this study has been to describe the structure and ownership of television broadcasting, radio broadcasting, and cable, and examine the effects on market conduct as well as economic and programing performance.

In Chapter two we described, at the macro level of the national economy, the structure of television, radio, and cable, in terms of the ownership pattern within and across media. We argued, however, that in defining the market one must take into account substitution possibilities in both consumption and production. This means that Canada as a whole is not the relevant market; a television station in St. John's is not in competition with a station in Victoria. The relevant market is the signal shed. In Chapter four, for television, and Chapter eight, for radio, we suggested that the Census Metropolitan Area is a reasonable and convenient approximation for the signal shed. For purposes of the study we selected the Census Metropolitan Areas of fourteen cities for television and sixteen for radio as our markets. In both chapters, the structure of each market was described in terms of the number of revenue and audience competitors, Herfindhal Indices indicating the revenue and audience concentration, audience market share, group ownership, and cross ownership.

Chapter six and Chapter seven examined the conduct and performance of television stations in view of the ownership, concentration, and other market structure characteristics described in Chapter four. In the expectation that audience size is an important determinant of the price of television time, explanations of audience size were sought in Chapter five. The regression results indicated

that U.S. stations available by cable only, Canadian independents, Global, and T.V.A. affiliates suffer significant handicaps in attracting viewing audience. Other stations appear to compete on an equal footing. In Chapter six, as expected, we find evidence of a positive relationship between advertising rates and market audience, population, and per capita income. There is some support for the suggestion that nationally defined television-radio groups have higher advertising rates whereas national television newspaper chains have lower rates. The result that is surprising is that, when the inter-dependence between market audience and television rates is ignored, the Herfindhal Index on a revenue basis is significantly negatively related to advertising rates. A possible explanation is that when a market is dominated by one or two firms, the other competitors feel forced to offer low rates.

In Chapter seven we found that television-radio cross ownership within a market contributes to significantly higher price-cost margins. When the interdependence between market audience size and price-cost margin is ignored, per capita income, television-television group ownership, and conglomerate ownership are significant determinants of the price-cost margin. When the interdependence is allowed for these ownership variables became insignificant; however, market audience is significant and television-newspaper group ownership has a significant and large negative effect on the price-cost margin. Although the relationship between advertising rate and Herfindhal Index was unexpected, the relationship between market concentration and price-cost margins is not. The Herfindhal Index is found to be a significant and positive determinant of the price-cost margin. Increases in market power appear to lead to higher profits.

Chapters nine through eleven comprised a similar examination of radio conduct and performance in view of the ownership, concentration, and other market structure characteristics described in Chapter eight. Chapter nine considered the determinants of audience. Formats which resulted in a substantial handicap were found to be country and western, multi-format, and minority language. F.M. and non-local location also had a significant and adverse affect on audience size. In Chapter ten we find that, contrary to television, market concentration, measured by the Herfindhal Index, and market share exert a strong positive effect on advertising rates. Radio-newspaper cross-ownership is the single most significant ownership factor. This type of cross-ownership has a positive effect on advertising rates, the effect being greater if the cross-ownership is within the same market. This result can be explained by the increase in market power resulting from less competition for the advertising dollar. In Chapter eleven no statistically significant results were obtained in our incomplete attempt to explain radio profit rates.

In Chapters three and twelve different facets of the performance of broadcasting stations and groups were explored; namely profitability and programing respectively. Chapter three revealed that television corporations earn a weighted average rate of return of 32.2% with the corporations having the largest broadcasting base obtaining the largest return. At the group level television-television groups were the most profitable with a 45.2% return whereas television-radio groups earned 19.5%. The overall rate of return for radio corporations was found to be substantially lower at 18.1% and the most profitable type of group, radio-newspaper, earned 27.6%. All these

rates of return are far in excess of the competitive benchmark that we suggested of 13% for an average risk industry. We then explicitly considered the level of risk for six publicly quoted communications companies and examined whether the return to their stockholders was higher or lower than appropriate for the risk. In general, the results supported the contention that returns are unusually high.

The results in Chapter twelve supported the expectation that programing performance, measured in terms of balance, diversity/duplication, and viewer choice is affected by type of ownership. In television, C.B.C. Owned French stations and C.B.C. Owned English stations were found to provide better balance and more diversity than private broadcasters. At the market level our regression results indicate that C.B.C. Owned French stations and P.B.S. stations add substantially to viewer choice whereas the effect of U.S. commercial stations is a lot less. The limited analysis of radio programing indicated less diversity than found on television and also some evidence of complementarity between the offerings of F.M. and A.M. stations.

Chapter fourteen considered cable. The average rate of return was found to be 24%, a return between that earned by radio and that earned by television corporations. The cost function for cable exhibited economies of scale that are quickly exhausted but economies of density that are substantial. Hence the optimal number of firms is a function of the expected penetration rate of these firms.

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McFADYEN, STUART

Ownership in the broadcasting industry.

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