



Determinants of profit in the broadcasting industry : Evidence from Japanese micro data

Kasuga, Norihiro
Shishikura, Manabu

(Citation)

Information Economics and Policy, 18(2):216-228

(Issue Date)

2006-06

(Resource Type)

journal article

(Version)

Accepted Manuscript

(URL)

<https://hdl.handle.net/20.500.14094/90000169>



Determinants of Profit in the Broadcasting Industry

-Evidence from Japanese Micro Data-

Norihiro Kasuga †

Associate Professor
Nagasaki University
4-2-1 Katafuchi, Nagasaki
Nagasaki 850-8506 Japan
n-kasuga@net.nagasaki-u.ac.jp
Tel/Fax: 095-820-6396

Manabu Shishikura

Researcher
Institute for Information and Communications Policy
2-1-2 Kasumigaseki, Chiyoda-ku
Tokyo 110-8926 Japan
m-shishikura@soumu.go.jp
Tel: 03-5253-5496
Fax: 03-5253-5497

† Contact Author. Our conclusions, opinions, and other statements in this paper are those of the authors and are not necessarily of our affiliated organizations. We are very grateful for useful comments from the seminar participants of The Japan Society of Public Utility Economics and the Japan Economic Policy Association. Financial support from Hoso-Bunka Foundation, Inc. is gratefully acknowledged.

Summary

In this paper, we will offer an empirical analysis of the relationships between (a) the structural, operational, and regional characteristics of the businesses of the commercial terrestrial broadcasters that form the core of Japan's existing broadcasting system and (b) the profitability of these broadcasters. The findings may be summarized as follows.

- (i) A positive correlation can be seen with audience share, which is a proxy variable for market share, but no clear conclusion can be reached with respect to market concentration.
- (ii) There is a positive correlation with the scope of household coverage and with income per capita.
- (iii) The variable showing each station's ability to produce its own programs correlates positively with revenue and negatively with profit.

We also find that the variables indicating market conditions, such as the number of households covered and the income level of the area of operation, have a greater effect in determining profits. In the period ahead, it will probably be necessary to think about the proper shape of efficient management for terrestrial broadcasters, including the possibility of mergers or other forms of consolidation. But the results of our analysis indicate that it is also important to consider the standards for prevention of concentration in such a way as to even out the regional gaps in market conditions. And they show that a redrawing of the administrative boundaries in such a way as to even the regional operating conditions might even out the revenues and profits of broadcasters and the number of channels that people can watch.

Keywords: Terrestrial Broadcasting Station, Determinants of profit, Media Ownership Rule, Audience Share, Oligopolistic market

(JEL Classifications: D43, L13, L82)

1. Introduction

In the face of rising concerns about the negative impact on broadcasters from the switch to digital and multichannel broadcasting, the “Media Ownership Rule (MOR)” of mass media is now under review; the hope is that greater concentration and aggregation can lead to improved efficiency. But concentration and aggregation of media business organizations may cause over-concentration of media control and media profits.

Also, the MOR as currently applied in Japan limits the scope of media organizations’ business on the basis of the country’s division into 47 prefectures, but it is hard to claim that this sort of restriction based on administrative units is rational in terms of economic or operational efficiency.

The review, while taking ample note of the tradeoffs relating to concentration and aggregation, must also involve reconsideration of the appropriateness of the existing standards in a number of respects, such as the geographical delimitation by prefectures, the concrete numerical limits on numbers of broadcasting stations, and the scope of application of the rules. It is not easy, however, to come up with generalized standards or levels that are both consistent and appropriate with respect to both of these aspects; it will thus be necessary to make decisions based on an empirical perspective (See Appendix 1).

In what follows, we will offer an empirical analysis of the relationships between (a) the structural, operational, and regional characteristics of the businesses of the commercial terrestrial broadcasters that form the core of Japan’s existing broadcasting system and (b) the profitability of these broadcasters. Our focus on analyzing the impact of these characteristics on broadcasters’ profitability is in line with our understanding that profits are a direct indicator of broadcasters’ operational stability and that, since any revision of the MOR will affect both broadcasters’ expenses and their revenues, it is essential to consider both these aspects, which an analysis of profits allows us to do. We will discuss this point further in section 2 of this chapter.

We believe it is appropriate to consider commercial terrestrial broadcasters separately because they depend on advertising for their revenue, in which respect they differ from paid broadcasters in terms of their market environment and the way in which viewers (users) perceive them. Furthermore, these broadcasters account for an overwhelming share of both advertising and broadcasting services;¹ this suggests that neither other types of advertising media nor other types of broadcasters are in a position to replace them or even to compete with them seriously (see Figures 1 and 2). So it

¹ If we look at advertising spending in the four major media (television, newspapers, magazines, and radio), we find that terrestrial broadcasting has an extremely large share, accounting for about 50% of the total. Also, advertising holds an extremely important position in terms of its share of broadcasters’ revenues, accounting for about 70%.

seems reasonable to us to focus our consideration of the issue of MOR just on the terrestrial broadcast advertising market.

-----Insert Figures 1 and 2 about here -----

The remainder of this chapter is organized as follows: Section 2 offers a simple presentation of the industrial structure and economic characteristics of commercial terrestrial broadcasters, and section 3 surveys previous studies in this area. In section 4 we present the empirical model for our estimates. Section 5 considers the results of our estimates. And section 6 presents the implications and conclusions of our study.

2. Structure of the Broadcasting Industry

The principle of media nonconcentration is implemented concretely in the form of geographical delimitations of media markets and limitations on the numbers of stations within these markets. As a result, the market that commercial terrestrial broadcasters find available is split by region, and it is an oligopoly into which entry is limited.² According to the traditional “SCP” hypothesis, the limitations imposed by the *structure* of the media market work through the *conduct* of media businesses in the market to affect their *performance*, that is, the profits they earn from the market. Specifically, this hypothesis predicts that the geographical scope of the market and limitations on the number of entrants will affect the profits of broadcasters in the form of differences in cost-effectiveness and earning power. Table 1 compares major financial indicators for the broadcasting industry and other types of industry. As these figures indicate, broadcasters’ profits per sales are considerably higher than those of other industries, while on the outgo side, their ratio of fixed costs is also higher, and their large figures for personnel expenditures show that human resources are an important input element for them.

-----Insert Table 1 about here -----

The expenses involved in broadcasting services consist of program production costs and transmission costs; for both of these, it has been noted that economies of scale and/or

² The 127 existing television stations are legally independent business entities, but almost all of them are affiliated with a Tokyo-based key station (the five major affiliations being with NNS, JNN, FNS, ANN, and TXN), and even if they are independent, they are extremely small in scale.

density exist. Also, the advertising charges for a “broadcast slot” reflect the audience ratio (number of people) and other indicators of a station’s audience-drawing power; the revenue of a broadcaster is affected both by the number of households in its area of coverage and by the number of broadcasters operating in this area.³ It thus would seem that limitations on the geographical scale of the market affect the profits of broadcasters through the impact of economies of scale and/or scope on their cost effectiveness, and that limitations on the number of stations (market share) affect their profits through the impact on their earning power.

The relationship between geographical market scope and the number of stations (market share) on the one hand and profits on the other may be explicitly indicated as follows. The advertising demand directed by sponsors at commercial terrestrial broadcasters is given by the following formula.

$$p = f(X) = j_0 X^{j_1} Y^{j_2} \quad (1)$$

Here X is the sum of the production of all broadcasters ($X = \sum x_i$), and Y is an indicator of the characteristics of the regional economy. The average and marginal costs of broadcaster i are taken to be fixed at value c_i (however $c_i \neq c_j, (i \neq j)$). In this case, a broadcaster’s profits are indicated by the following formula.

$$\pi_i = f(X)x_i - c_i x_i \quad (2)$$

According to the condition of profit maximization,

$$\frac{\partial \pi_i}{\partial x_i} = \frac{\partial f(X)}{\partial x_i} x_i + f(X) - c_i = 0$$

Here, if we divide the total production between that of broadcaster i and that of other broadcasters, writing $X = x_i + X_{-i}$, the above formula can be expressed as

$$\frac{\partial \pi_i}{\partial x_i} = \frac{df}{dX} (1 + \lambda_i) x_i + f(X) - c_i = 0, \text{ where } \lambda_i \equiv \frac{\partial X_{-i}}{\partial x_i}$$

³ If one considers the effectiveness of advertising, factors like population structure and income levels have an impact, but it is difficult to see these factors as being included in the determination of revenue (level of charges) based on current audience share.

If we assume that each broadcaster's conjectural variation, λ_i , is zero,⁴ we can then derive this formula:

$$\frac{px_i - c_i x_i}{pX} = \left(\frac{x_i}{X}\right)^2 \left(-\frac{X/p}{dX/dp}\right) \quad (3)$$

If we then take the total for all industries and set the Herfindahl-Hirschman index as $HHI = X(x_i/X)^2$ and the price elasticity of demand as η , then the profits of all industries may be expressed as

$$\pi = pXx_i - Xc_i x_i = HHI \cdot (1/\eta) pX$$

Next, if we substitute the value of p from formula (1) and simplify, we get

$$\pi = HHI \cdot (j_0 j_1) X^{j_1+1} Y^{j_2}$$

If we then assume that there is a fixed correlation between total profits and the profits of individual broadcasters, like $MS_i = (\pi_i / \pi)^\alpha$, and simplify again, we can derive the following formula:

$$\ln \pi_i = a_0 \ln c + a_1 \ln MS_i + a_2 \ln HHI + a_3 \ln X + a_4 \ln Y \quad (4)$$

The profit level of each broadcaster, we see, is related to its profit share MS_i , the Herfindahl-Hirschman index HHI , the total production level of the industry X , and the indicator of regional characteristics Y . In other words, the above formula shows that profits are affected by the regional factors, the number of firm in that market and cost of each firm. The Herfindahl-Hirschman index can be broken down into

$$HHI = \sum_{i=1}^n S_i^2 = (1/n) + n\sigma^2$$

consisting of the inverse of the number of enterprises in the market plus the product of the number of enterprises and the variance of market share. For this reason, even if the broadcasters each have a comparable share of the market in which they are competing, a change in the number of broadcasters in the market n will cause a change in the value

⁴ This means an expectation that others will not change their production volumes in response to an increase in one's own level of production.

of *HHI*. So there would seem to be a certain significance in estimating the correlation between market share and market concentration.

3. Previous Studies

First of all, the oligopolistic structure of broadcasting markets is caused by the fact that only licensed firms can participate; analysis of how the structure resulting from this limitation grants the power to control these markets and thereby affects profits can be approached from two angles: analysis through comparison with other industries or analysis within the industry to determine whether there are differences in profits arising from differences in the operating environment for broadcasters, such as the number of stations and the degree of market concentration.

In the former category, Noll et al. (1973) reported that profits had been high in the US broadcasting market since the 1950s, and a similar phenomenon has been noted in Japan. In the latter category, examples of previous studies include (i) Fournier (1986), who used the *k*-firm concentration ratio, and (ii) Bates (1993) and Ekelund et al. (2000a), who used the Herfindahl-Hirschman index.

Fournier (1986) focused on the fact that the price-cost margin became significantly higher in cases where the number of firms in the market was small, and he tried a number of estimates controlling for whether firms were affiliated with a network or not and for broadcasting station scale, based on which he showed that differences in degree of concentration had virtually no effect on the level of profit ratios.

Bates (1993) derived figures for *HHI* from data for 1977, 1987, and 1992; though the figures were all on the high side, he showed that they differed depending on whether audience data or advertising revenue data were used, with the latter yielding especially high figures.

Ekelund et al. (2000a) looked at a sample of 549 US radio stations' advertising prices in 1995–96 and did an empirical study of how they related to the degree of concentration, using data for both the entire advertising market and the program-supply market. They made estimates using multiple *HHIs*, including the expected *HHI* based on demographic factors and the *HHI* calculated from the number of station owners; in every case they found no significant correlation between concentration and profits.

Next, there are studies that consider the relation between being affiliated with a network⁵ and securing profits, such as Besen (1976) and Fournier (1986), that focus on

⁵ In television broadcasting, there are four major networks in the United States (ABC, NBC, CBS, and Fox).

program production costs, such as Crandall (1972), and that compare profits based on a split into subsamples of network affiliates and non-affiliates, such as Fisher et al. (1980); the results of all of their measurements show that network affiliation allows stations to save on costs and secure higher profit rates. Program production is labor intensive and requires large initial investments, but marginal reproduction costs are low, meaning that economies of scale work strongly. Since network affiliation allows the costs to be avoided or distributed and to be recovered efficiently, it has a positive effect on profits.

In addition, Ekelund et al. (1999), in a study of the US terrestrial radio broadcasting market, examined whether the market was seen as regionally split.⁶ Since own price elasticity shows up as negative, higher prices for advertising at a particular station will cause advertisements to shift to other regions, resulting in decreased revenues. Similar findings were confirmed by Ekelund et al. (2000b) in a study of the television broadcasting market. These results indicate that even though restraints on entry may formally split the market, there are strong links between neighboring markets in the field of broadcast advertising, with the result that it is not possible for broadcasters to exert market control; this explains why the correlation between concentration and profits is weak in this field.

4. Empirical Model

In what follows we will offer an analysis using the following formula, which is based on the correlations shown above in formula (4).

$$\ln \pi_i = \ln \alpha_0 + \alpha_1 \ln RATE_i + \alpha_2 \ln HHI_i + \alpha_3 \ln ASEET_i + \alpha_4 \ln(HH / N)_i + \alpha_5 \ln Y + \alpha_6 \ln SELF_i + \ln \varepsilon_i \quad (5)$$

In making our estimates, we use the annual audience share $RATE_i$ as the profit share of each broadcaster (MS_i), and we use each station's total assets $ASEET_i$, which are a variable representing their scale, for X , which indicates the level of production of the industry as a whole.

This involves taking the each broadcasting station's share of the total profits of

⁶ There is a possibility that higher prices for advertising in a particular market may increase demand for advertising in other regions where the price has become relatively lower. If stations belong to networks, there is a strong chance that the programs will be the same, and so in this case a shift to other regions can be expected to occur more smoothly than independent case.

the broadcasting industry to reflect its audience share. Inasmuch as spot advertising charges, which, as we have noted above, are a major determinant of each firm's profits, are themselves based on annual audience shares, this seems like a reasonable assumption.

Also, the number of households in each region $(HH / N)_i$, local household income Y_i , and the share of the station's self-produced programs $SELF_i$, which in turn serves as the variable indicating differences in program production costs, are used as explanatory variables for Y , the factor showing geographical conditions (limitations) faced by each station. The numbers of households and audience shares are used in other countries as indicators in determining whether the level of concentration is excessive, and it seems that these might be considered by policymakers for use in Japan as substitute yardsticks in connection with the reorganization of the broadcasting market here.⁷ (See Appendix 2). The data are the pooled figures for all the broadcasters for the three years from fiscal 1998 through 2000 (fiscal years starting in April). The estimates were made on the basis of "fixed effects/ random effects," and the choice of a model was made on the basis of the Hausman test.

-----Insert Table 2 & 3 about here -----

5. Estimation Results

Table 3 presents the results of our estimations. With respect to the dependent variable, π_i , we primarily focus on operating profit (net base) because our model is induced based directly on profit ((i), (i)', (i)'). In addition, we also estimate an equation with respect to operating revenue (gross base), R_i , for comparison ((ii), (ii)'). It has sometimes been pointed out that the cost minimization principle is not applicable in the broadcasting industry. If this hypothesis is correct, it means that cost has importance in respect to companies' behavior, and the suggested explanatory variables are directly connected with only revenue, not with profit (= revenue – cost). We also show another estimation result in equation (iii) (total sample 240), excluding large sized stations in three metropolitan areas (Tokyo, Kansai and Cyukyo). Equation (iv) (total sample 189) shows the results excluding the three metropolitan area and other backbone stations (Stations in Hokkaido, Miyagi, Hiroshima and Fukuoka). The tendency of result is almost the same.

⁷ As yardsticks for limits on ownership, the United States uses the total potential nationwide viewer households, Germany uses the sum of annual average audience shares in the television market, and Britain uses total nationwide viewing time. See Ministry of Internal Affairs and Communications (2003).

The findings may be summarized as follows.

- (i) A positive correlation can be seen with audience share, which is a proxy variable for market share, but no clear conclusion can be reached with respect to market concentration.
- (ii) There is a positive correlation with the scope of household coverage and with income per capita.
- (iii) The variable showing each station's ability to produce its own programs correlates positively with revenue and negatively with profit.

In particular, while there is no significant correlation with the variable HHI_i , which indicates the degree of market concentration, there is a significant negative correlation with $SELF_i$, indicating that stations earn larger profits to the degree that they get programs from their network. These findings are consistent with the results of earlier studies.⁸

With respect to the fixed-effect model vs. random-effect model, we made a number of estimates based on changes in the operating area for the revenue/profit estimation equation, but the results showed the random-effect model to be appropriate in every case for formulas relating to profits. For the formulas concerning revenues, by contrast, the fixed-effect model was chosen in every case.⁹ The finding that the fixed-effect model is chosen for revenues means that some sort of particular effect can be measured (for a certain station or time period). It has been observed that there is a setup involving mutual dependence among commercial terrestrial broadcasters, centering on key stations; the findings here may suggest that sort of situation. But since there are no noteworthy tendencies concerning particular prefectures (geographical areas) or network affiliations, no values are reported for individual fixed effects.

At the same time, the fact that the random-effect model was adopted in every case with respect to revenues would, if we also take the cost side into consideration, seem to indicate that there are drastic variations from station to station and from one point in time to another reflecting differences in competitive results and management strategies. If we also consider the fact that the figures used for these estimations exclude the profits and costs for radio and related businesses, it would seem that in Japan's case there is room for further scrutiny of the conventional theory that television stations are managed in line with a budget system.

⁸ Webbink (1973) analyzed new entrants into terrestrial broadcasting from 1966 to 1968 and found a significant positive correlation with the number of households per station.

⁹ The CS (cross-section) weight in the table refers to the results estimated by applying a weighting in variance, considering the difference among groups in variance of error terms.

-----Insert Table 4 about here -----

6. Implications and Conclusions

If we look at the coefficients of the variables in the results of the previous section, we find that the variables indicating market conditions, such as the number of households covered and the income level of the area of operation, have a greater effect in determining profits than such variables as broadcasters' audience shares and their rates of self-produced programming. In other words, this means that the latent attraction of market entry varies among the regions that are currently delimited by regulation. In fact, the number of commercial terrestrial broadcasters in Japan varies from one operating area to another. And since the present setup does not level out the differences in numbers of households covered or in income levels, if it were to become possible to freely enter the market within the bounds of the existing administrative divisions, the differences in the numbers of broadcasters in the various regions might well grow even larger.

As long as market principles are being observed, it may be only natural for regional gaps to emerge in the numbers of broadcasters. But inasmuch as terrestrial broadcasting is treated as a basic service and subject to systematic restraints on operating areas, it is desirable to minimize the regional differences in numbers (in other words, the differences in the number of channels people can watch). Given the importance of the role that existing terrestrial broadcasters now play in Japan, this sort of policy response seems essential.

In the period ahead, it will probably be necessary to think about the proper shape of efficient management for terrestrial broadcasters, including the possibility of mergers or other forms of consolidation. But the results of our analysis indicate that it is also important to consider the standards for prevention of concentration in such a way as to even out the regional gaps in market conditions. And they show that a redrawing of the administrative boundaries in such a way as to even the regional operating conditions might even out the revenues and profits of broadcasters and the number of channels that people can watch.

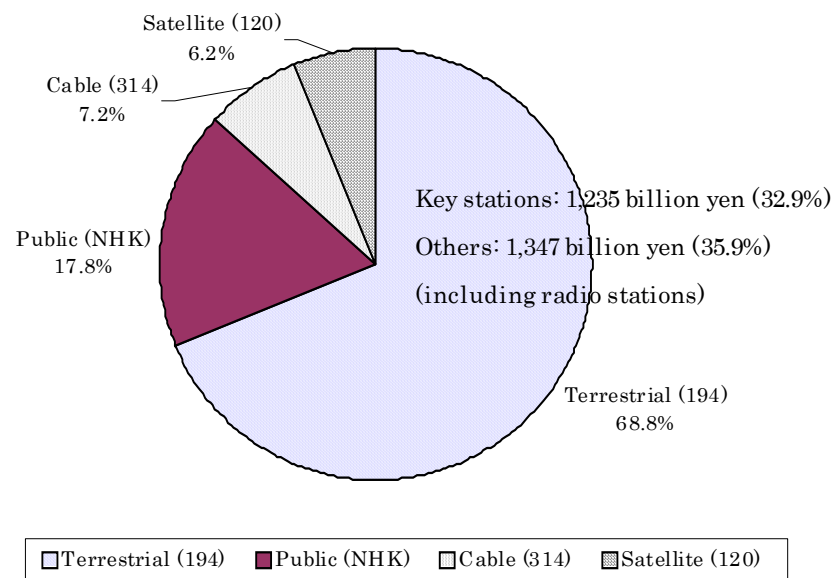
The wave of digitalization may lower the barriers to entry into the field of terrestrial broadcasting services and greatly shake up the existing setup of networks. If uniform restraints aimed at preventing concentration continue to be applied in this context, the operational finances of terrestrial broadcasters, particularly those in nonmetropolitan regions, are liable to become even more strained. It seems to us that

providing a system that helps close the gaps in operating conditions so as to allow broadcasters to operate autonomously, thereby maintaining diversity in broadcasting and the availability of broadcasting as an advertising medium, can ultimately serve the interests of viewers and listeners.

References

- Bates, B. (1993) "Concentration in Local Television Markets," *Journal of Media Economics*, Vol. 6, Issue 3, Fall, pp. 3-19.
- Besen, S. (1976) "The Value of Television Time," *Southern Economic Journal* 42, January, pp. 435-441.
- Crandall, R. (1972) "FCC Regulation, Monopsony and Network Television Program Costs," *Bell Journal of Economics and Management Science* 3, pp. 483-508.
- Dentsu Communication Institute Inc. (2003) *Annual Report of Advertising 03/04*, [In Japanese: *Dentsu koukoku nenkan*]
- Ekelund, R., G. Ford and J. Jackson (1999) "Is Radio Advertising a Distinct Local Market? An Empirical Analysis," *Review of Industrial Organization*, Vol. 14, Issue. 3, pp. 239-256.
- Ekelund, R., G. Ford and T. Koutsy (2000a) "Market power in radio markets: an empirical analysis of local and national concentration," *Journal of Law and Economics*, XLIII, April, pp. 157-184.
- Ekelund, R., G. Ford and J. Jackson (2000b) "Are local TV market separate markets?," *International Journal of the Economics of Business*, Vol. 7, No. 1, pp. 79-97.
- Fisher, F., J. McGowan and D. Evans (1980) "The Audience-Revenue Relationship for Local Television Stations," *Bell Journal of Economics* 11, Autumn, pp. 694-708.
- Fournier, G. M. (1986) "The Determinants of Economic Rents in Television Broadcasting," *Antitrust Bulletin* 31, pp. 1045-1066.
- Ministry of Internal Affairs and Communications (2003) *The Final Report of Study Group on Broadcasting Policy*. [In Japanese: *Housou Kenkyukai Saisyu Houkoku*]
- Noll, R., M. Peck and J. McGowan (1973) "Economic Aspects of Television Regulation," Washington D.C.: Brookings Institution.
- Senate Environment, Communications, Information Technology and the Arts Legislation Committee (2002) "Report on Broadcasting Services Amendment (Media Ownership) Bill 2002," Australia.
- Kasuga, N. and M. Shishikura (2004) "Demand Analysis for Broadcasting Media," *Paper presented at 3rd International Conference*, The Japan Economic Policy Association, November 14, (http://wwwsoc.nii.ac.jp/jepa/IC2004/IC2004_program.htm).
- Sugaya, M. and K. Nakamura ed. (2001) *The Economics of Broadcasting Media*, Chuo Keizai Sya. [In Japanese: *Housou Media no Keizaigaku*]
- Webbink, D. (1973) "Regulation, Profits, and Entry in the Television Broadcasting Industry," *Journal of Industrial Economics* 21, April, pp. 167-176.

Figure 1. Market Size of the Broadcasting Industry in Japan

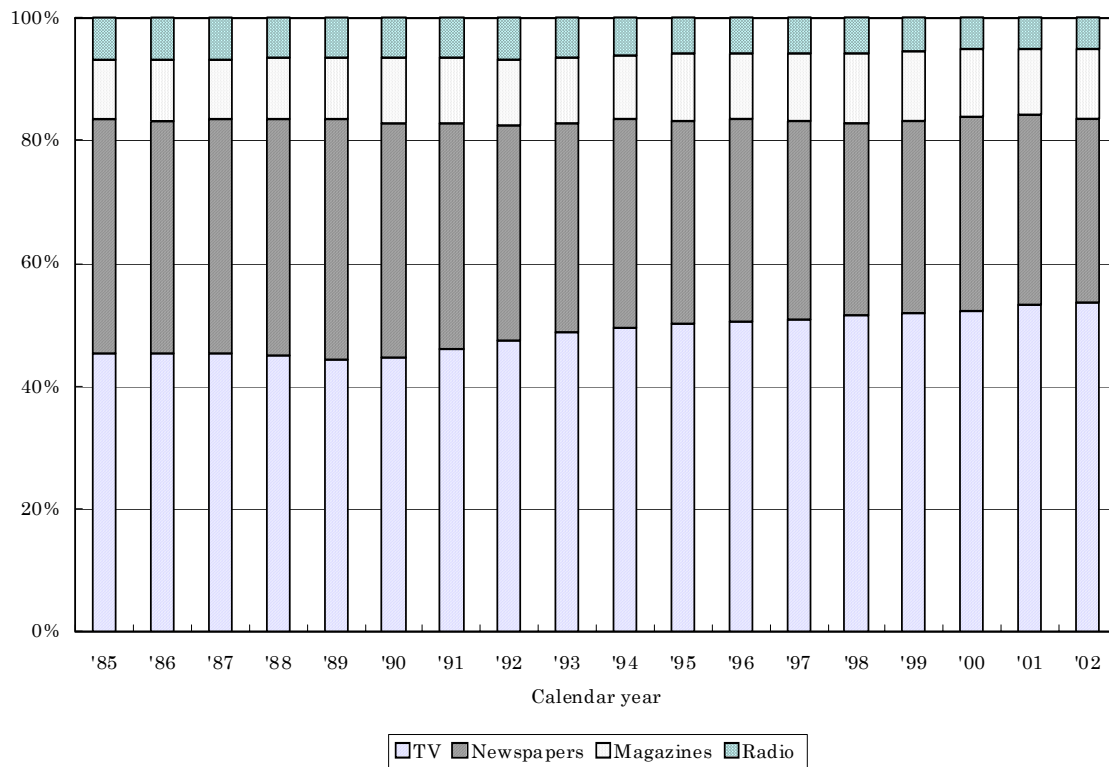


(Total: 3,755 billion yen, fiscal year 2001)

Source: Ministry of Internal Affairs and Communications (2003)

Notes: Unmarked figures in parentheses indicate numbers of stations.

Figure 2. Advertising Expenditures on Major Mass Media (shares)



Source: Dentsu Communication Institute Inc. (2003)

Table 1. Financial Indicators for Broadcasting and Other Industries

	Broadcasting industry			Nonmanufacturing industries			Average of all industries		
	1996	1997	1998	1996	1997	1998	1996	1997	1998
Ordinary profit per sales	9.63%	11.31%	10.99%	1.84%	1.86%	1.98%	3.00%	2.92%	2.51%
Fixed costs per sales	30.76%	30.23%	29.09%	21.84%	22.08%	23.93%	25.41%	25.82%	27.61%
Rate of personnel expenditure	12.64%	12.28%	12.69%	7.68%	7.71%	8.51%	9.51%	9.60%	10.35%

Source: Ministry of International Trade and Industry.

Note: Due to a reorganization of government ministries, 1998 is the last year for which the above data is available.

Table 2. Explanatory Variables for Estimation

$RATE_i$	Annual average audience share in the market in which station i operates
HHI_i	Herfindahl-Hirschman index of the market in which station i operates (calculated on the basis of audience shares)
$ASSET_i$	Total assets of station i
$(HH / N)_i$	Number of households per station in the market in which station i operates
Y_i	Income per household in the market in which station i operates
$SELF_i$	Variable indicating ability of station i to produce programs for itself

Table 3. Basic Statistics of Primary Variables

Variables		Mean	Standard deviation	Minimum	Maximum
Dependent variables					
R	Annual revenue of each station	20613020	507241	953966	318589400
lnR	(natural logarithm)	15.9447	1.0201	13.7684	19.5794
π	Annual profit of each station	2167510	68901	2468	62498160
ln π	(natural logarithm)	13.3699	1.3393	7.8112	17.9507
Independent variables					
RATE	Annual average audience share in the market in which station i operates	7.8801	2.1519	2.2000	14.5000
lnRATE	(natural logarithm)	2.0212	0.3125	0.7885	2.6741
HHI	Herfindahl-Hirschman index calculated using RATE	0.2627	0.0444	0.2120	0.3573
lnHHI	(natural logarithm)	-1.3496	0.1584	-1.5512	-1.0292
HH/N	Number of households per station in the market where station i operates	405634.5	583915.2	92565.0	2637072.0
ln(HH/N)	(natural logarithm)	12.4195	0.8377	11.4357	14.7852
Y	Income per household in the market where station i operates	10.3746	1.6062	7.2810	13.0832
lnY	(natural logarithm)	2.3270	0.1593	1.9853	2.5713
SELF	Capability for procurement of self-produced TV programs by each station	0.1093	0.1779	0.0019	0.9368
lnSELF	(natural logarithm)	-2.9161	1.1971	-6.2418	-0.0653
ASSET	Total gross assets of each station	24285760	603601	1024709	399340700
lnASSET	(natural logarithm)	16.1179	1.0382	13.8399	19.8053

Table 4. Estimation Results with Respect to Determinants of Profit and Revenue

Dependent variables	ln(π_i): Profit			ln(R_i): Revenue		ln(π_i)	ln(π_i)
	All areas			All areas		sample 240	sample 189
	OLS (i)	OLS (i)'	OLS (i)''	OLS (ii)	OLS (ii)'	OLS (iii)	OLS (iv)
Independent variables							
lnRATE	0.767 *** 3.539	0.618 *** 3.235	- 0.063	0.292 *** 4.564	0.263 *** 8.850	0.815 *** 2.918	1.195 *** 3.197
lnHHI	-0.387 -1.440	- 0.063	0.063 0.260	0.028 0.365	0.068 * 1.808	-0.280 -0.922	-0.576 -1.532
ln(HH/N)	1.046 *** 7.454	0.999 *** 7.314	0.715 *** 6.716	0.727 *** 16.309	0.738 *** 47.604	1.288 *** 6.862	1.429 *** 5.076
lnY	1.068 *** 3.404	0.954 *** 3.150	0.798 ** 2.585	0.083 0.435	0.169 ** 2.193	1.137 *** 3.117	1.197 ** 2.591
lnSELF	-0.186 *** -3.153	-0.182 *** -3.078	-0.123 ** -2.133	0.081 *** 5.214	0.087 *** 12.966	-0.205 *** -3.080	-0.210 *** -2.855
lnASSET	0.392 *** 3.498	0.440 *** 4.117	0.595 *** 6.084	0.362 *** 11.034	0.339 *** 21.424	0.340 ** 2.560	0.214 1.374
Constant	-11.927 *** -6.034	-10.130 *** -6.577	-7.081 *** -4.871	(Omit) (Omit)	(Omit) (Omit)	-13.959 *** -4.687	-15.715 *** -3.846
R ²	0.707	0.702	0.690	0.986	0.999	0.401	0.451
Adjusted R ²	0.700	0.697	0.685	0.979	0.999	0.385	0.433
No. of observations	282	282	282	282	282	240	189
Wu-Hausman Test	5.462	3.133	0.980	11.401	11.401	4.857	4.857
(p-value)	0.486	0.679	0.964	0.077	0.077	0.434	0.434
Fixed or random	Random	Random	Random	Fixed(no weight)	Fixed(CS weight)	Random	Random

***: 1% critical value

**: 5% critical value

*: 10% critical value

Appendix 1: Media Ownership Rule (MOR)

The MOR provides that, with the exception of the Tokyo metropolitan area and the Kinki region, terrestrial broadcasters are in principle limited to a single prefecture (of which Japan has 47). It also prevents the concentration of influence in the hands of any single station by limiting the equity stake that any regional station can hold in another station in the same prefecture to a maximum of 10% and the equity stake that any key station can hold in a regional station to under 20%.

A report prepared by the Ministry of Internal Affairs and Communications (2003) suggested relaxation of the MOR to allow the merger of neighboring regional stations and the conversion of financially failed stations into subsidiaries. In the background of the moves to relax this principle are hopes that consolidation and mergers will lead to greater operational efficiency, stronger operational and financial foundations, particularly for local stations in the regions.

Since there are various social demands with respect to broadcasting, including MOR, it may be asserted that conventional economic principles cannot be applied without modification. And it is certainly not our intention to deny the existence of elements like news and education, which are not necessarily driven by profits. However, broadcasting services also have a commercial element in the provision of transmission slots for advertisers; also, if their economic stability is not secured, they cannot respond to the relevant social demands. In this sense it is possible to look on broadcasters as conducting business activities in line with certain economic principles while also being subject to various limitations relating to the social environment. In fact, in Australia, Senate Environment, Communications, Information Technology and the Arts Legislation Committee (2002) have conducted a cost-benefit analysis concerning introduction of the MOR.

Appendix 2: Note on Data and Variables

(1) For broadcasters financial data we used various annual editions of the *Nihon minkan hoso nenkan* (Japan commercial broadcasting annual) and the *Communications Industry Survey* conducted by Ministry of Internal Affairs and Communications; for audience share data we used the average annual figures for each broadcaster compiled by Video Research Ltd. For regional economic variables we used the *Zenkoku shichoson yoran* (Nationwide directory of municipalities) prepared by the *Municipal Self-Rule Research Association* and *Kenmin keizai keisan* (Prefectural economic calculations) compiled by the Economic and Social Research Institute, Cabinet Office.

(2) In cases of operation in more than one prefecture, we added the figures for the entire area. We adjusted nominal figures to real figures, and we adjusted for broadcasters operating both television stations and radio stations in accordance with their composition shares.

(3) In conducting the estimation, we also tried using tangible fixed assets in place of total assets, but since the results showed basically the same tendencies, we have omitted the results.

(4) Here we assume it is necessary for station to put in large amount of money for TV program production in order to increase advertising price, and this cost is proportional to station scale, X .

(5) It may be suggested that $SELF_i$ is by nature an endogenous variable, but in our analysis we

treated it as an external environmental variable. The main reasons for this are the realistic considerations that (a) even though the requirement by regulatory authorities, in fact few broadcasters meet this requirement, and it seems that this variable is not necessarily based on independent management decisions, and (b) new-entrant broadcasters have little program-production know-how, meaning that their ability to produce their own programming is limited.