Reciprocal Carriage of Vertically Integrated Cable Networks: An Empirical Study

Jun-Seok Kang
Dept. of Telecommunications
Indiana University
1229 E. 7th St.
Bloomington, IN 47405
juskang@indiana.edu

July 28, 2005

Jun-Seok Kang is a graduate student in the Dept. of Telecommunications Ph.D. program, Indiana University. This paper was prepared for presentation at the 33nd TPRC Research Conference on Communication, Information, and Internet Policy, Washington, D.C., September 23-25, 2005. An earlier version of this paper was awarded First Prize in the annual TPRC Student Paper Contest. I thank David Waterman for comments.

Abstract

Using a dataset of carriage decisions by 943 cable systems for 22 start-up basic cable networks, this study tests the "reciprocal carriage" hypothesis: the theory that multiple cable television system operators (MSOs) tacitly collude to carry each others' vertically integrated cable networks. The research supports the reciprocal carriage hypothesis by finding that: (1) A vertically integrated MSO is more likely than a non-vertically integrated MSO to carry the start-up basic cable networks of other MSOs; and, (2) a vertically integrated MSO is no more likely than a non-vertically integrated MSO to carry independent start-up basic cable networks. These results make credible an underlying premise of a 30 percent national market share limit that the Federal Communication Commission established in 1993: namely, that MSOs might tacitly collude in their carriage decisions, having the effect of restricting market access to startup cable networks in which those MSOs have no ownership interest. The study suggests the difficulty of the entry and growth of non-vertically integrated independent start-up cable networks. More generally, this study suggests circumstances under which vertically integrated firms may collude in the market for intermediate goods.

1. Introduction

On May 4, 2001, the US Court of Appeals for the District of Columbia ruled that the Federal Communications Commission's (FCC) horizontal limit, which prohibits a multiple cable system operator (MSO)[1] from reaching more than 30 percent of the nationwide subscription to multi-channel video programming distribution (MVPD) services, is in excess of its statutory authority (*Time Warner Entertainment Co. v. FCC*, 2001). The 30 percent horizontal limit was designed to promote competition in the cable television programming market by protecting the entry and growth of non-vertically integrated start-up cable networks. The major rationale of the limit is the potential anticompetitive effects of "reciprocal carriage" (FCC, 1999). Reciprocal carriage means that MSOs tacitly collude to carry each others' vertically integrated cable networks. A concern of Congress and the FCC was that reciprocal carriage might lead to the collective denial of non-vertically integrated start-up cable networks. The Court and the FCC, however, disagreed significantly regarding the existence of reciprocal carriage. According to the Court, the FCC failed to justify the horizontal limit by providing any evidence or plausible explanations in support of reciprocal carriage[2].

While the possibility of reciprocal carriage was early recognized by the FCC, there has been no study that systematically investigates the issue. It still remains unclear whether reciprocal carriage is a real threat to non-vertically integrated independent cable networks. The objective of this paper is to examine the existence of reciprocal carriage in the cable television industry. A simple game model suggests that, as long as the cable networks of other MSOs are not close substitutes for its integrated cable networks, a vertically integrated MSO has an incentive to carry the cable networks of other MSOs, while expecting other vertically integrated MSOs to

---

[1] An MSO is an entity that operates more than one local cable system.

[2] The Court stated that "if that phenomenon implies the sort of collusion the Commission infers, one would expect the Commission to be able to point to examples. Yet it names none." According to the Court, the FCC never explained 1) why the vertical integration of MSOs gives them mutual incentive to reach carriage decisions beneficial to each other, 2) what may be the MSO's incentive to buy from one another, and 3) what the probabilities are that the MSOs would engage in reciprocal carriage. (*Time Warner Entertainment Co. v. FCC*, 2001).

also carry its networks[3]. Reciprocal carriage is possible under the unique structure of the cable television industry in which an upstream market – a cable programming market – is competitive and downstream firms – local cable systems – are local monopolists. Reciprocal carriage would increase vertically integrated cable networks' market penetration at the expense of their competitors.

Using a data base of 943 local cable systems, this study empirically tests the reciprocal carriage hypothesis. The study finds that a vertically integrated MSO is more likely than a non-vertically integrated MSO to carry the start-up basic cable networks of other MSOs. The analysis also reveals that a vertically integrated MSO is no more likely than a non-vertically integrated MSO to carry independent start-up basic cable networks[4]. Taken as a whole, the empirical evidence reported here strongly supports the existence of reciprocal carriage in the cable television industry.

At a general level, this study investigates a new anticompetitive effect of vertical integration and horizontal concentration. The present study suggests that, in an industry where 1) downstream firms are local monopolists in geographically separated markets, 2) the upstream market is competitive, 3) downstream firms use several inputs to produce final goods, 4) inputs produced by vertically integrated firms are not close substitutes, and 5) vertically integrated local monopolists are owned by very few number of national owners, vertically integrated firms may have an incentive to buy each other's inputs. Once vertically integrated firms succeed in colluding, it enables them to reach downstream markets which they could not access before. However, reciprocal buying discourages upstream entry of independent suppliers by discriminating against suppliers that are not integrated with any downstream firm. If independent suppliers could not achieve minimum viable scale due to a large number of the participants in reciprocal buying, the suppliers might be forced to exit the market. When the policy objective is to improve diversity in the upstream market, as in the cable television industry, the consequences of reciprocal buying could be very serious.

---

[3] That is to say, vertically integrated firms tacitly collude to buy each others' intermediate goods.
[4] Here independent networks refer to cable networks which are not integrated to any MSOs.

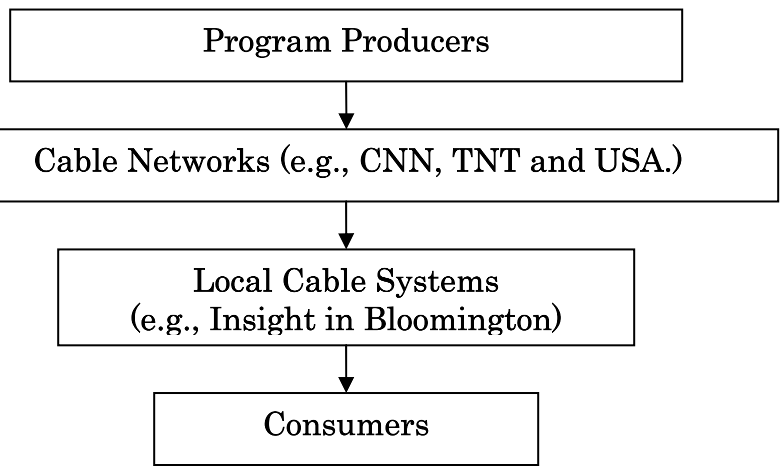
The paper proceeds as follows: section 2 will briefly introduce the structure of the cable television industry and the FCC's ownership regulation on MSO size. Section 3 reviews prior research relating a cable system's programming carriage decisions. Section 4 presents the reciprocal carriage model and the hypotheses of the study. Section 5 describes the empirical models and the data employed in the study. In section 6, the results of the empirical test will be described. Section 7 will present the summary of the results and discuss the implications of the study.

2. Background: Industry Structure and the FCC's Horizontal Ownership Regulation

2.1. Structure of the Cable Television Industry

The cable television industry can be decomposed of three components, based on the production stages: 1) program production, 2) programming packaging, and 3) programming distribution.

Figure 1. The Market Structure of the Cable Television Industry



Cable networks aggregate and package video programs that are created by program producers. There are three types of ownership characteristics of cable networks: (1) vertically integrated cable networks, which are integrated with MSOs[5]; (2) horizontally integrated cable networks, which are integrated with established cable networks; and (3) stand alone cable networks, which are owned neither by MSOs nor by established cable networks.[6] Local cable systems buy the packaged video programs from cable networks and distribute them to cable service subscribers. If a cable system does not carry a cable network, that network has no chance to reach the local market that is franchised by the cable system, except through Direct Broadcast Satellite (DBS). Usually, local cable systems are owned by

[5] For instance, CNN is owned by Time Warner which is the second largest MSO in the U.S.

[6] For ease of presentation, in the study, both horizontally integrated cable networks and stand alone cable networks are called "non-vertically integrated cable networks" or "independent cable networks."

very few numbers of national chains which are called MSOs. The structure of the cable industry can be summarized as: 1) the upstream market is competitive, while each downstream firm is a local monopolist, 2) downstream firms are concentrated in a few national owners, 3) downstream firms use multiple inputs to produce final services, and 4) some upstream firms are integrated with downstream firms.

2.2. The FCC's 30 Percent Horizontal Limit

The FCC's horizontal limit is a response to the heightened social concerns that the concentration of cable systems in the hands of a few media gatekeepers could potentially bar the entry of new cable networks and reduce the number of media voices available to consumers. In the Cable Television Consumer Protection and Competition Acts of 1992, Congress directed the FCC to determine the appropriate horizontal size of MSOs. The purpose of the limitation is to "… ensure that no cable operator or group of cable operators can unfairly impede, either because of the size of any individual operator or because of joint actions by a group of operators of sufficient size, the flow of video programming from the programmer to the consumer" (FCC, 1999).

Following the direction of Congress, the FCC established the 30 percent horizontal limit on MSO size in 1993. The FCC believed that to be viable in the MVPD market, a start-up cable network requires an open field of 40 percent of the market[7]. However, using only the assumption of an open field of 40 percent, the FCC cannot justify its horizontal limit, since just a 60 percent horizontal limit would be enough to provide an open field of 40 percent to a start-up cable network. The rationale of the FCC is that MSOs have incentives to carry each others' vertically integrated cable networks; furthermore, such carriage behaviors will lead to the collective denial of non-vertically integrated independent start-up cable networks. Thus, the FCC argued that the horizontal limit must account for a possibility that a group of cable system operators would collectively deny carriage to a start-up cable network, either by unilateral, independent decisions or by tacit collusion (FCC,

[7] Whether the 40 percent open field assumption is right is not the concern of the present study. The study focuses on reciprocal carriage of vertically integrated cable networks.

2001). The FCC argued that the 30 percent horizontal limit would provide 40 percent of the open field for independent cable networks, even if the largest two MSOs collusively exclude the start-up independent cable networks.

3. Literature on Cable Network Carriage Decisions by Local Cable Systems

Economic studies of cable network carriage decisions have tended to focus on impacts from vertical integration[8] and horizontal integration. These studies mainly focus on the foreclosure effect of vertical integration on local cable systems' programming carriage decisions (e.g., Waterman and Weiss, 1997) or on the transfer of efficiency gains from vertical integration or horizontal concentration to consumers in terms of the number of cable networks carried on cable systems (e.g., Chipty, 1995). Waterman and Weiss (1996) found that premium movie networks, such as HBO, are more frequently carried by cable systems integrated with the networks. They also revealed that a vertically integrated cable system is less likely than other cable systems to carry rival networks.

Chipty (1995) found that large MSOs supply more basic cable networks than do small MSO[9]. She argued that large MSOs with bargaining power have lower input costs and offer more channels on their cable systems than do small MSOs. Ford and Jackson (1997) partially supported the logic of Chipty by finding that a cable system owned by a large MSO has fewer total programming costs than does a cable systems owned by a small MSO. However, the study by Kim (1996) and another study by Chipty (2001), which control the effects of the size of local cable system, find no significant relationship between an MSO's horizontal size and the number of cable networks carried on its systems.

4. Reciprocal Carriage in the Cable TV Industry

Using a simple game model, this section illustrates a vertically integrated cable system's incentives for reciprocal carriage. Suppose that only two cable

---

[8] Two models, a transaction efficiencies model and a vertical foreclosure model, have been used to explain the relationships between vertical integration and the carriage decisions of cable systems (Waterman and Weiss, 1997). The transaction efficiencies model proposed that the integration between cable networks and MSOs will increase efficiencies through eliminating double marginalization, avoiding the risk of opportunistic behavior, and reducing the risk of changing conditions. The vertical foreclosure model predicts that vertically integrated MSOs have considerable incentive to deny the carriage of their rival cable networks or other cable networks. That incentive comes from the commitments of vertically integrated MSOs to their integrated cable networks.

[9] In the study, Chipty (1995) did not include an important control variable that is the size of local cable systems in terms of the number of subscribers.

markets, Market A and Market B, with symmetric demand conditions exist. The critical feature to note about the structure of the cable television industry is that each SO is a local monopolist in the franchised area. Thus, the study assumes that those two markets are controlled by two cable system operators, SO A and SO B, respectively. Five start-up cable networks — NA1, NA2, NB1, NB2, and NI — are trying to get off the ground. The study assumes that each of these cable networks is equally attractive to advertisers and consumers. Limited channel capacity forces each SO to select no more than two start-up cable networks. Networks NA1 and NA2 are owned by SO A. NB1 and NB2 are owned by SO B. Start-up cable network NA1 is not competing with NB1. NA1 is directly competing with NB2, and start-up cable network NA2 is competing with NB1.[10] NI is not owned by either of the two SOs. The two SOs have symmetric costs and revenue structures and have complete information on the structure. If neither SO carries a cable network, the network cannot be launched. The cost of the un-launched cable network then becomes zero.

Table1. Game Table

		SO B				
		NB1	NB1 + NB2	NB1+NA1	(NB1+NA2)*	NB1+NI
SO A	NA1	(3, 3)	(3, 6)	(8, 5)	(8, 0)	(3, 5)
	NA1 + NA2	(6, 3)	(6, 6)	(11, 5)	(11, 0)	(6, 5)
	NA1 + NB1	(5, 8)	(5, 11)	(10, 10)	(10, 5)	(5, 10)
	(NA1+ NB2)*	(0, 8)	(0, 11)	(5, 10)	(5, 5)	(0, 10)
	NA1 + NI	(5, 3)	(5, 6)	(10, 5)	(10, 0)	(5, 5)

* Same program category.

Table 2. Hypothetical Cost and Revenue Structures

	Network NA1	Network NA2	Network NB1	Network NB2	Network NI
Each market's additional revenue from carrying the network	5	5	5	5	5

[10] When directly competing cable networks are carried by a cable system, we can expect that expected revenue would substantially decrease for the cable system. In the model, the researcher gives 50 percent of the discount rate for such format duplication on the revenue of each cable network to cable systems.

License fee per market	3	3	3	3	3
Production cost of the network	4	4	4	4	4
Expected advertising revenue of the network per market	2	2	2	2	2

Using the hypothetical costs and revenues structure of Table 2, the study calculates the payoffs of the game as in Table 1[11]. Each cell within the table lists payoffs to those two SOs that arise under the configuration of strategies that placed the player into that cell. The row and column headings of the table show strategies available to SO A and SO B, respectively. Each of the SOs has four possible strategies: 1) carry only one of its integrated networks, 2) carry two (= all) of its integrated networks, 3) carry one of its integrated and one of other SO's integrated networks, and 4) carry one of its integrated networks and one independent network.

4.1. Non-Repeated Game

In the context of a non-repeated game, once the carriage decision of each SO is made, the decision is permanent. In Table 1, we can easily find that SO A's dominant strategy is to carry its two vertically integrated start-up networks NA1 and NA2. For SO B, its dominant strategy is also to carry its two integrated start-up networks, NB1 and NB2. Since no SO has an incentive to deviate from its strategy, given that the other SO does not deviate, we can say the strategy combination is that of the Nash equilibrium. The equilibrium outcome yields each SO a payoff of 6 in profit.

4.2. Repeated Game

[11] For example, suppose that SO A chooses to carry NA1 and SO B chooses to carry NB1 and NA1. The payoffs of SO A are calculated by the following equation: π(SO A) = (the expected additional revenues from NA1 in market A) + (the expected advertising revenues of NA1 from market A) + (the expected advertising revenues of NA1 from market B) + (the licensing fee of NA1 from market B) – (the production costs of NA1) = 5 + 2 + 2 + 3 – 4 = 8.

To think that the two SOs are repeatedly interacting is more realistic. After a carriage contract between a cable network and a SO is expired, the SO needs to make another carriage decision. Because the actions of SOs are observed at the end of each period, it is possible for SOs to condition their strategies on the past actions of their opponent. This scenario can lead to equilibrium outcomes that do not arise when the game is played only once. In the non-repeated game, each of the SOs has a lower profit (=6) than if it had been able to cooperate and carry one of its own and one of other SO's networks (=10). This is clearly inefficient since the outcome of reciprocal carriage is strictly preferred by both SOs.

Suppose that the two SOs are initially in the cooperative mode: each of them carries one of its affiliated start-up networks and one of other SO's start-up networks. Then, the payoffs to each SO become 10. If one of the SOs, say SO A, deviates from the carriage strategy and carries only its own two affiliated start-up networks, it can increase its profit from 10 to 11. At this point, SO B does not have any incentive to continue to cooperate, since the changed strategy of SO A will result in a decreased payoff from 10 to 5 for SO B. The cooperation would then break down and the profit for SO A would be 6 instead of 10, which is 4 less than it would have been had SO A not cheated during the first stage of the game. Consequently, no SO has an incentive to deviate from the strategy of reciprocal carriage.

4.3. Sources of Reciprocal Carriage

The fundamental basis for reciprocal carriage is the unique structure of the cable television industry. As described in section 2.1, SOs are geographically separated with monopoly power. This means that SOs are not directly competing with each other: one does not directly gain as a rival loses. For example, if Best Buy and Circuit City, which are large electronics retailers in the U.S., were monopolists each in its own local market, one retailer's gains would not lead to losses by the other retailer. Therefore, there are incentives for the two retailers to coordinate their actions to maximize each others' profits[12]. Similarly, an SO has enough

[12] e.g. If Best Buy is good at producing cordless telephones and Circuit City is good at producing MP3 players, the retailers can increase each others' profits by reciprocally carrying the products.

incentive to carry a rival's vertically integrated cable networks, as long as the cable networks of other SOs are not directly competing with its own cable network.

The second source is repeated interaction between SOs. Collusion is unlikely when SOs do not anticipate interacting again in the near future, since short-term gains from a deviation could not be punished. Carriage contracts between cable systems and cable networks are frequently renewed, and the interaction does not have a fixed horizon. Thus, a deviation SO can be easily retaliated against. If a SO stops carrying cable networks of other SOs, other SOs will not renew the carriage contract with the cable networks of the deviator. The third source is the information structure of the cable television industry. Since the program lineup of a cable system is publicly available information, SOs can notice the deviation of other SOs in real time. The fourth source is a characteristic of media goods. When an SO sells its integrated cable networks to another SO, a very low or zero additional cost for the SO is incurred because once the program is produced, the content can be copied with zero or very little cost. As a result, reciprocal carriage will add the license fees and advertising revenues with no additional costs. If the marginal cost of distributing a cable network is large enough, there would be no incentive for reciprocal carriage.

4.4. Hypotheses

The idea of reciprocal carriage leads us to reach several testable hypotheses about the carriage decisions of cable systems for start-up cable networks.

H1: A vertically integrated MSO is more likely than other MSOs to carry its integrated start-up cable network.

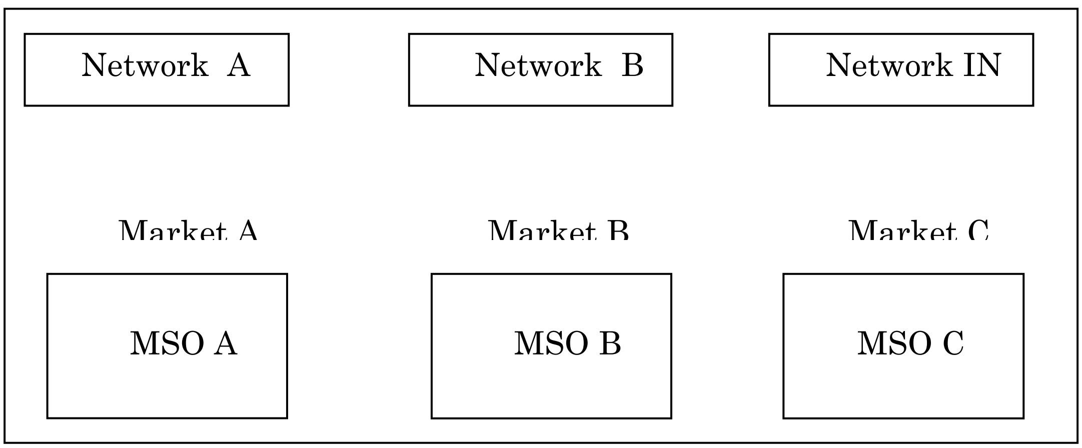
H2-1: A vertically integrated MSO is more likely than a non-vertically integrated MSO to carry the start-up cable networks of other MSOs.

H2-2: The more cable networks an MSO owns, the more likely that MSO to carry the start-up cable networks of other MSOs.

H3-1: A vertically integrated MSO is no more likely than a non-vertically integrated MSO to carry non-vertically integrated independent start-up cable networks.

H3-2: As an MSO owns more cable networks, it becomes no more likely to carry non-vertically integrated independent start-up cable networks.

Figure 2. Hypothetical Market Situation



Using Figure 2, the hypotheses of the study can be illustrated. MSO A owns start-up cable network Network A and MSO B owns start-up cable network Network B. MSO C does not have any vertically integrated cable networks. Network IN[13] is a non-vertically integrated start-up cable network. H1 predicts that MSO A is more likely than other MSOs to carry Network A. H2-1 predicts that MSO A is more likely than MSO C to carry Network B. H2-2 predicts that, as MSO A owns more cable networks, MSO A becomes more likely to carry Network B. H3-1 predicts that MSO A and MSO B are no more likely to carry Network IN than MSO C is. H3-2 predicts that as MSO A owns more cable networks, MSO A becomes no more likely to carry Network IN than it was initially. The reciprocal carriage hypothesis is supported when H2-1 through H3-2 are not rejected.

[13] Assume that all the three start-up cable networks are not directly competing with each other.

5. Empirical Models

5.1. Carriage of Vertically Integrated Start-up Cable Networks

To test H1, H2-1 and H2-2, this study investigates a cable system's carriage decisions for vertically integrated start-up basic cable networks. The decisions can be modeled as a cable system's probabilities of carriage of start-up cable networks as a function of various explanatory variables. The reduced form equations are given by

$$VINET_{il} = \beta_0 + \sum_{j=1}^{f} \gamma_j x_{j,l,t} + \beta_1 VI_{il} + \beta_2 VIMSO_{il} + U_{il} \qquad (1)$$

$$VINET_{il} = \beta_0 + \sum_{j=1}^{f} \gamma_j x_{j,l,t} + \beta_1 VIMSO_{il} + \beta_2 NONVIMSO_{il} + U_{il} \qquad (2)$$

where if vertically integrated start-up network i is carried on cable system l then $VINET_{il} = 1$; otherwise $VINET_{il} = 0$. $x_{j,l,t}$ is a set of control variables that may affect the carriage decision of the cable system. The specific variables are described in Table 1.

< Table 1 here>

The study creates the following group dummy variables representing the ownership status of cable system l; VI, $VIMSO$, and $NONVIMSO$. VI=1 means that local system l is vertically integrated with start-up network i. $VIMSO$=1 means that local cable system l is not integrated with start-up cable network i but integrated with other cable networks. $NONVIMSO$=1 means that local system l is not integrated with any cable networks[14].

It will be hardly surprising to find that the coefficient of the variable VI is positive and larger than those coefficients of $VIMSO$ and $NONVIMSO$. That result would suggest that an MSO favors its own vertically integrated start-up cable networks. The reciprocal carriage hypothesis will be tested by investigating the

[14] Recall Figure 2: say our interest cable network i is Network A. Then VI denotes MSO A, $VIMSO$ represents MSO B, and $NONVIMSO$ indicates MSO C.

relationship between variables $VIMSO$ and $NONVIMSO$. If MSOs are reciprocally carrying each others' vertically integrated start-up networks, then vertically integrated cable systems will be more likely to carry the start-up cable networks of other MSOs than will non-vertically integrated cable systems.

We cannot assume, however, that every vertically integrated MSO has the same incentive to carry the start-up cable networks of other MSOs. It is more reasonable to expect that, within the context of the reciprocal carriage model, an MSO with a large number of vertically integrated networks to be more likely to carry the start-up cable networks of other MSOs than is an MSO with a small number of integrated networks. This outcome occurs because an MSO that owns a large number of cable networks may suffer heavier losses, if other MSOs drop the cable network of the MSO, than will an MSO that owns a small number of cable networks. To implement that idea, equations (1) and (2) can be modified as follows.

$$VINET_{il} = \beta_0 + \sum_{j=1}^{f} \gamma_j x_{j,l,t} + \beta_1 VI_{il} + \beta_2 (VIMSO_{il} * NVI_l) + U_{il} \qquad (3)$$

Equation (3) includes the interaction effects between NVI, which is a continuous variable representing the number of cable networks owned by the owner of cable system l, and $VIMSO$. It is then possible to isolate the effect of the number of integrated networks of cable system l on the cable system's probabilities of carrying the start-up cable networks of other MSOs.

5.2. Carriage of Independent (Non-vertically Integrated) Start-up Cable Networks

There is a possibility that, for some reasons, a vertically integrated MSO is more likely than a non-vertically integrated MSO to carry both the start-up cable networks of other MSOs and non-vertically integrated independent start-up cable networks. If so, it is difficult to tell, just with the estimation results of the above reduced form equations, whether the results are caused by the transfer of efficiency gains from vertical integration or by reciprocal carriage. To address this potential problem, the study compares cable systems' carriage decisions for vertically integrated start-up networks with the carriage decisions for non-vertically integrated start-up cable networks. If we can show that a vertically integrated MSO is less likely or, at least, no more likely to carry non-vertically integrated cable networks, then the reduced form equations in section 5.1 are adequate to test the existence of reciprocal carriage. That is to say, only when H3-1 or H3-2 is confirmed, can the estimation results of equations (1) to (3) be interpreted as the consequence of reciprocal carriage. To test H3-1 and H3-2, this study will use the following reduced form equations.

$$INNET_{kl} = \beta_0 + \sum_{j=1}^{f} \gamma_j x_{j,l,t} + \beta_1 VII_l + U_{kl} \tag{4}$$

$$INNET_{kl} = \beta_0 + \sum_{j=1}^{f} \gamma_j x_{j,l,t} + \beta_1 NVI_l + U_{kl} \tag{5}$$

where if non-vertically integrated start-up network k is carried on cable system l then $INNET_{kl} = 1$; otherwise, $INNET_{kl} = 0$. VII is a dummy variable denoting that the owner of cable system l owns vertically integrated cable networks. NVI is a continuous variable representing the number of cable networks owned by the owner of cable system l. $x_{j,l,t}$ is a set of control variables which may affect the carriage behaviors of cable system l. Variables VII and NVI isolate the effects of the vertical integration of a cable system on the cable system's carriage decisions for non-vertically integrated start-up cable networks.

5.3. Control Variables

Besides the ownership status of local cable systems, several factors may affect cable system l's probabilities of carrying start-up cable networks. First, we can expect that channel capacity ($CAPA$), the number of basic cable subscribers ($BSUB$), and the price of basic and expended basic service ($RATE$) are positively related with the probabilities of the carriage of start-up cable networks. To control the effect of the horizontal size of the owner of cable system l, a variable denoting the total number of national basic service subscribers of the owner of cable system l (*HSIZE*) is included. In addition, a variable representing the number of cable systems owned by cable system l (*NOSYS*) is included. Since cable networks are not homogeneous, the characteristics of each start-up cable networks should be controlled for. Two important control variables for individual start-up cable networks are program quality and the age of the start-up cable networks. The measure of programming budget (*TCOST*) of a start-up network takes into account cable system l's incentive to carry promising high quality cable networks. The age (*AGE*) of start-up cable networks is included, on the assumption that older cable networks are more likely to be carried by cable systems.

5.4. Data

The primary data of this study is obtained from ***Television & Cable Factbook*** (1999). The ***Factbook*** complies survey responses from all existing cable systems in the U.S. The ***Factbook*** provides cable system level information, including the program lineup, the channel capacity, the number of subscriber, the rate of the service, and the ownership of cable systems. In 1998, about 11,000 local cable systems existed in the U.S. In an attempt to hold constant the number of subscribers for vertically integrated and non-vertically integrated cable systems, only cable systems that have more than 1,000 basic cable subscribers are included. After eliminating cable systems with out-dated information, a sample size of 943 cable systems remains. The ***Economics of Basic Cable Networks*** (1999), which contains information on the ownership and financial status of basic cable networks, supplements the database. Among start-up basic cable networks that had operated for no more than 5 years as of 1997, the ***Economics of Basic Cable Networks*** provides the information of 12 vertically integrated start-up basic cable networks and 10 non-vertically integrated start-up basic cable networks. Consequently, the study obtains two data sets, – One has 11,316 observations for 943 cable systems' decisions to carry 12 vertically integrated start-up networks; the other has 9,430 observations for 943 cable systems' decisions to carry 10 non-vertically integrated start-up cable networks. The data set permits the study to compare carriage decisions of two groups of MSOs – vertically integrated and non-vertically integrated MSOs – for two groups of start-up cable networks – vertically integrated and non-vertically integrated start-up cable networks.

5.5. Estimation

The binary dependent variables in equations (1) through (5) lead the study to estimate the empirical models with logit regression. However, potential statistical problems need to be addressed. First, since the study has clustered data in which each cable system's carriage decisions is repeatedly observed, it violates the assumption of independent observations. That is to say, the observations are independent across cable systems, but not necessary within cable systems. Second, there is a possibility of heteroskedasticity in the data. To address those problems, the study uses robust variance estimation (@@@ reference), which allows for heteroskedasticity and for correlation in errors across carriage decisions by a cable system.

6. Empirical Analysis

6.1. Results for Vertically Integrated Start-up Cable Networks

Table 6 shows the estimation results of a cable system's carriage decisions for vertically integrated start-up cable networks.

< Table 6 at here>

The positive and statistically significant coefficient of *VI* indicates that a cable system is more likely than other cable systems to carry its vertically integrated start-up cable networks. The marginal effect of *VI* suggests that a vertically integrated cable system is approximately 17 percent points more likely to carry its integrated start-up cable networks than a non-vertically integrated cable system[15].

[15] Parameter estimates and marginal effects are estimated using STATA 8.0.

Significantly, the study also finds that the coefficient of *VIMSO* is larger than that of *NONVIMSO* (See models 2 and 6 in Table 6). The Wald test, which measures the statistical difference between these two coefficients, indicates that the difference is statistically significant. The result supports H2-1 by suggesting that a vertically integrated cable system (*VIMSO*) is more likely than a non-vertically integrated cable system (*NONVIMSO*) to carry the start-up cable networks of other MSOs. The marginal effect of *VIMSO* indicates that a vertically integrated cable system is approximately 4 percent points more likely than non-vertically integrated cable systems to carry the start-up basic cable networks of other MSOs.

The estimation results of equation (3) are especially interesting since the positive and statistically significant coefficient of the variable *VIMSO* * *NVI* suggests that as the owner of a cable system owns more cable networks, the cable system becomes more likely to carry the start-up cable networks of other MSOs (See models 3, 4, 7 and 8 in Table 6); The marginal effects of *VIMSO* * *NVI* show that one additional integrated cable network increases the probability of carriage by approximately .9 percent. That is for example, when an MSO owns 10 vertically integrated cable networks, that MSO is 9 percent more likely to carry the start-up cable network of other MSOs than is a non-vertically integrated MSO. The negative coefficient of squared *VIMSO* * *NVI* indicates a curvilinear relationship between the number of basic cable networks owned by a cable system and the cable system's probabilities of carrying start-up cable networks of other MSOs with a turning point at 13[16]. The results imply that as the owner of cable systems accumulates up to 13 cable networks, the cable system's probabilities of carrying start-up cable networks of other MSOs increase linearly. Beyond 13 vertically integrated cable networks, the probabilities decline. However, the later effects might be negligible, since only TCI owned more than 13 basic cable networks at the time.

6.2. Results for Independent (Non-vertically Integrated) Start-up Cable Networks

[16] The turning point is found by calculating the point at which the slope of the curve becomes zero.

The estimation results of a cable system's carriage decisions for non-integrated start-up cable networks are reported in Table 7.

<Table 7 is at here>

If the results in section 6.1 are caused not by reciprocal carriage but by a vertically integrated cable system's general tendency to carry more cable networks, the cable system should be more likely than non-vertically integrated cable systems to carry non-vertically integrated independent start-up cable networks. The estimated coefficients of *VII* and *NVI* are not found to be positive and statistically significant in any model. The results thus support the reciprocal carriage hypothesis by indicating that a vertically integrated cable system is at least no more likely to carry non-vertically integrated independent cable networks than does a non-vertically integrated cable system[17].

6.3. Comparisons of the Two Results

The comparisons of the above estimation results suggest substantially different effects of vertical integration of a cable system on the system's carriage decisions for the two groups of start-up cable networks. The estimation results for vertically integrated start-up cable networks indicate that (1) a vertically integrated MSO is more likely than a non-vertically integrated MSO to carry the start-up

[17] However, there is considerable reason to suspect that the inclusion of FOX NEWS CHANNEL (FNC) in the sample may confound the estimation results. When FNC was launched, it offered a cash-for-carriage fee of approximately 10 dollars per subscriber to cable systems, which was an unprecedented move at the time. It is reasonable to presume that the cash-for-carriage fee has a substantial influence on a cable system's carriage decision to FNC. For instance, TCI, which was the largest MSO at the time, had an option to take a 20 percent equity stake in FNC or to receive 14 dollars per subscriber. TCI choose the option of cash-for-carriage fee and even dropped several cable networks from some of its cable systems to give channel space to FNC (Multichannel News, 1996). In an attempt to mitigate the potential bias that may be caused by including FNC in the sample, the study also estimates the models without FNC. When the study excludes FNC, the coefficient of *VII* becomes negative and the coefficient of *NVI* turns out to be negative and statistically significant (model 5 through model 8 in Table 7). The results may suggest that as a vertically integrated cable system has more number of cable networks, the probabilities of carriage of non-vertically integrated independent cable networks become lower.

networks of other MSOs on its systems, and (2) as the owner of cable systems owns more cable networks, the cable systems become more likely to carry the start-up cable networks of other MSOs.

However, the estimation results for non-vertically integrated start-up cable networks show that (1) a vertically integrated MSO is less likely or no more likely than a non-vertically integrated MSO to carry independently owned start-up cable networks[18], and (2) as the owner of cable systems owns more cable networks, the cable system becomes no more or less likely to carry independently owned start-up cable networks. The different effects of vertical integration of cable systems on the cable system's carriage decision for the two groups of start-up cable networks strongly suggest the existence of reciprocal carriage in the cable television industry.

6.4. Results for Control Variables

The estimation results of control variables are similar for both vertically integrated and non-vertically integrated start-up cable networks. As expected, the variables *CAPA*, *BSUB*, and *RATE* turn out to be statistically significant and positively related with the probabilities of carrying start-up cable networks. The results indicate that (1) cable systems with a larger channel capacity, (2) cable systems with a larger number of subscribers, and (3) cable systems with a higher services rate are more likely to carry start-up cable networks. The findings are consistent with previous studies on a cable system's programming carriage decisions. The positive and statistically significant coefficients of *PROCOST* and *AGE* support the idea that high quality (high programming costs) and older start-up cable networks are more likely to be carried by cable systems. Interestingly, the study finds that the national size of the owner of cable systems, which is measured as the number of cable systems operated by the owner (*NOSYS*), is negatively related with the probability of carriage. The results may suggest that large MSOs are slow to make carriage decisions for start-up cable networks. Similarly, the results may reflect the diffusion process of start-up cable networks. In other words, there is a possibility that start-up cable networks diffuse from small MSOs to large MSOs.

[18] In the study, independently owned cable networks refer to non-vertically integrated cable networks.

7. Discussion

The findings of this study have several interesting implications. First, by providing systematic evidence of reciprocal carriage, the study supports the rationale of the FCC that the horizontal limit should be designed to account for the possibility that a group of cable operators might collectively deny carriage to a start-up cable network. Considering the relatively large number of MSOs in 1998, even weak evidence for reciprocal carriage suggests potentially serious consequences from an excessive horizontal concentration among MSOs. However, it should be noted that the study, in itself, does not support the FCC's current level of the horizontal limits. According to the FCC, the 30 percent limit assumes the coordinated action by two MSOs rather than three or more MSOs. However, if we agree with the possibility of a collusive action among MSOs, there is no compelling reason to believe that the limit should be designed with only the two largest MSOs in mind. Of course, the collusion is less likely when there are more MSOs. However, arguing that there is no possibility of tacit collusion among three or more MSOs but only among two MSOs is not very persuasive. With the current 30 percent horizontal limit, the three largest MSOs, having 90 percent of MVPD market, could obviously deter the entry of non-vertically integrated start-up cable networks. Then, the non-integrated start-up cable network would have an open field of only 10 percent of the market, which is substantially lower than the level needed to survive and grow. This analysis suggests that in some sense the 30 percent limit may be quite generous for MSOs.

Second, the study provides insights into the advantages of vertically integrated cable networks by revealing the existence of reciprocal carriage. The finding may help to explain why vertically integrated start-up cable networks are growing faster than non-vertically integrated start-up cable networks (Kang, 2005). A recent development in the cable television industry provides an explicit example of the benefits of reciprocal carriage. In 2001, Time Warner made a carriage agreement with the Chinese government that will enable the company to distribute its China Entertainment Television (CETV) in China in exchange for carrying China Central

Television (CCTV) on Time Warner's cable systems (Multichannel News, 2001). The carriage agreement would not have been possible if their markets were not geographically separated or if either of Time Warner and the Chinese government did not have cable systems to carry the cable network of the other party. By carrying each others' cable networks, the two parties can reach the market where it is difficult to penetrate without such relationships.

Third, the reciprocal carriage model offers a different interpretation of the results of previous studies which show a positive relationship between the vertical integration of a cable system and the number of carried cable networks on that cable system. Those studies hypothesize that if the ownership status of vertically integrated cable systems gives efficiency gains to the cable systems, the benefits should be transferred to consumers and the cable systems should offer more cable networks than do non-vertically integrated cable systems (e.g. Ford and Jackson, 1997; Chipty, 2001). However, there is a possibility that this logic is seriously flawed. Since cable systems are monopolists in each local market, those cable systems may not have much incentive to transfer the efficiency gains of MSOs to consumers in terms of the number of cable networks. The economic theory of the transfer of efficiency gains from vertical or horizontal integration to consumers assumes a competitive market[19]. The finding of previous studies might be more reasonably explained by the reciprocal carriage model which suggests that vertically integrated cable systems are more likely than non-vertically integrated cable systems to carry their own integrated cable networks and other MSOs' cable networks.

Fourth, the implications of the reciprocal carriage model are not limited to the cable television industry. For instance, AT&T Wireless in the U.S. and NTT DoCoMo in Japan made a roaming agreement that enables a cellular user of each firm to make and receive calls or access other services automatically when the user travels to the other country by using the visited country's wireless network. In an

[19] Contrary to popular assumption, the effect of efficiency gains from the horizontal size of MSO on the number of cable networks carried on cable systems is found to be non-significant (Kim, 1996; Emmons and Prager, 1997; Ford and Jackson, 1997; Chipty, 2001), while the bargaining power of the MSO may allow the MSO's cable system to have lower programming costs (Ford and Jackson, 1997). The results may imply that an MSO has no incentive to transfer their efficiency gains to consumers in terms of the number of carried cable networks.

industry where the firms are geographically separated and the marginal costs of serving additional consumers are very low, the firms can take advantage of reciprocal carriage. If AT&T Wireless and NTT DoCoMo were competing for the same customer in the same geographical market or if the marginal costs of serving additional customer were large, it would be impossible for the two firms to act in such a cooperative mode.

8. Conclusion

This study develops and empirically tests the reciprocal carriage hypothesis. Using a simple game model, the study shows the incentives for reciprocal carriage: An MSO carries the cable networks of other MSOs, while expecting other MSOs also to carry its vertically integrated cable networks. The study also provides empirical evidence in support of the existence of reciprocal carriage. The study finds that a vertically integrated MSO is more likely than a non-vertically integrated MSO to carry the start-up cable networks of other MSOs on its cable systems. By revealing that a vertically integrated MSO is no more likely to carry non-vertically integrated independent start-up cable networks, the study assures us that the finding is not the result of the vertically integrated MSO's general tendency to carry more cable networks. Clearly it is the result of reciprocal carriage.

What then should be the optimal structural policy in the cable television industry? Regarding this question, it should be pointed out that the present study does not argue that the net effects of integrations in the cable television market are negative. The integrations give rise to a difficult tradeoff in evaluating the structure of an industry, since both efficiency-enhancing effects and anti-competitive effects are incurred. The study focuses on the existence of reciprocal carriage, rather than on assessing the welfare effects of these integrations. Thus, the question remains to what extent the horizontal concentration in the cable programming distribution market is economically relevant and deserving of regulatory intervention or antitrust scrutiny. However, considering the diversity of cable networks ownership is an exceptional policy interest, the evidence found here supports the FCC's major rationale for horizontal ownership regulation[20].

[20] As the number of vertically integrated MSOs decreases, the probability of reciprocal carriage would increase and non-integrated independent cable networks would be less likely to achieve minimum scale of operation that is necessary for long-term survival of the networks.

References

Chipty, T. (1995). Horizontal Integration for Bargaining Power - Evidence from the Cable-Television Industry. *Journal of Economics & Management Strategy, 4*(2), 375-397.

Chipty, T. (2001). Vertical integration, market foreclosure, and consumer welfare in the cable television industry. *American Economic Review, 91*(3), 428-453.

Donohue, S. (2001, October, 21). AOL Time Warner net gains access to China. *Multichannel News*.

Economics of Basic Cable Networks (1999). Carmel, Calif.: Paul Kagan Associates.

Emmons, W. M., & Prager, R. A. (1997). The effects of market structure and ownership on prices and services offerings in the U.S. cable television industry. *Rand Journal of Economics, 28*(4), 732-750.

Federal Communications Commission, (1999). *Third report and order* (MM Docket No. 92-264).

Federal Communications Commission, (2001). *Further notice of proposed rulemaking* (CS Docket No. 98-82, 96-45, MM Docket No. 92-264, 94-150, 92-51, 87-154).

Ford, G. S., & Jackson, J. D. (1997). Horizontal concentration and vertical integration in the cable television industry. *Review of Industrial Organization, 12*(4), 501-518.

Katz, R. (1996, November, 25). News waits for next shoe to drop. *Multichannel News*.

Kang, J. S. (2005). *Determinants of the growth of start-up basic cable programming networks.* Paper presented at the International Communication Association, New York.

Kim, E. M. (1996). Standardization and Diversity in Cable System Programming. Unpublished Ph.D. Dissertation, Northwestern University.

Television & Cable Factbook. (1999). Washington, D.C.: Warren Communications Inc.

Time Warner Entertainment Co. v. FCC, 240F.3.d 1126 (D.C. Cir. 2001)

Waterman, D. (1996). Local monopsony and free riders. *Information Economics and Policy, 8*, 337-355.

Waterman, D., & Weiss, A. A. (1996). The effects of vertical integration between cable television systems and pay cable networks. *Journal of Econometrics, 72*(1-2), 357-395.

Waterman, D. , & Weiss, A. (1997). *Vertical integration in cable television*. Cambridge, Mass. Washington, D.C.: MIT Press ; AEI Press.

<Table 3 > Variable Definitions

Variables	Definition	Mean	S.D.
	Dependent Variable		
$VINET_{il}$	Dummy variable for carriage of vertically integrated start-up network i on system l. (i = 1,…12, l = 1,…, 943)	.162	.368
$INDNET_{kl}$	Dummy variable for carriage of non-vertically integrated start-up cable network k on cable system l. (k = 1, …, 10, l = 1, …, 943)	.167	.373
	Independent Variables		
VI_{il}	If start-up network i is vertically integrated with the owner of cable system l, VI_{il} =1. Otherwise, VI_{il} =0.	.092	.289
$VIMSO_{il}$	If the owner of cable system l has any number of vertically integrated cable network, except start-up cable network i, $VIMSO_{il}$ =1. Otherwise, $VIMSO_{il}$ =0.	.211	.408
$NONVIMSO_{l}$	If the owner of cable system l has no vertically integrated cable networks, $NONVIMSO_{il}$ =1. Otherwise, $NONVIMSO_{il}$ =0.	.696	.696
VII_{l}	If the owner of cable system l has any number of vertically integrated cable network, VII_{l} =1. Otherwise, VII_{l} =0.	.303	.459
NVI_{l}	Number of vertically integrated networks owned by the owner of cable system l.	4.075	7.003
$CAPA_{l}$	Channel capacity of cable system l.	53.502	18.977
$BSUB_{l}$	Number of subscriber of the basic cable service of cable system l.	26,611.98	69,058.81
$RATE_{l}$	Sum of basic and extended cable service rates of cable system l.	26.287	6.459
$DMA1_{l}$	If cable system l is in the largest 50 broadcast television market, $DMA1_{l}$ =1. Otherwise, $DMA1_{l}$ =0.	.290	.454
$DMA2_{l}$	If cable system l is in broadcast market 51-100, $DMA2_{l}$ =1. Otherwise, $DMA2_{l}$ =0.	.165	.371
$DMA3_{l}$	If cable system l is in broadcast market 101-210, $DMA3_{l}$ =1. Otherwise, $DMA3_{l}$ =0.	.335	.472
$HSIZE_{l}$	Number of total basic subscriber of the MSO which owns the local system l.	3,455,114	4,978,979
$NOSYS_{l}$	Number of cable systems that owned by the owner of cable system l.	306.983	377.963
AGE_{i}	Age of the start-up cable network i as of 1998.	2.75	1.421
$TCOST_{i}$	Total production budget of the start-up cable network i as of 1998. (million dollars)	44.95	26.084

< Table 4> Correlation matrix of variables for the carriage of vertically integrated start-up cable networks

	VINET	CAPA	BSUB	RATE	DMA1	DMA2	DMA3	NOSYS	HSIZE	TCOST	AGE	VI	VIMSO	NONVIMSO	NVI	NVI*VIMSO
VINET	1.000															
CAPA	.215	1.000														

BSUB	.103	.232	1.000													
RATE	.099	.177	.054	1.000												
DMA1	.054	.271	.025	.057	1.000											
DMA2	.002	-.032	.003	-.057	-.284	1.000										
DMA3	-.026	-.089	-.131	-.057	-.454	-.316	1.000									
NOSYS	.027	-.031	.117	-.056	.099	.016	-.054	1.000								
HSIZE	.068	.075	.233	-.047	.176	.016	-.079	.919	1.000							
TCOST	.336	.000	.000	.000	.000	.000	.000	.000	.000	1.000						
AGE	.301	.000	.000	.000	.000	.000	.000	.000	.000	.476	1.000					
VI	.097	.041	.109	-.028	.092	.003	-.039	.468	.493	.070	-.061	1.000				
VIMSO	.038	.139	.243	.002	.184	-.005	-.068	.498	.633	-.049	.043	-.165	1.000			
NONVIMSO	-.095	-.149	-.284	.015	-.222	.002	.085	-.738	-.873	.000	.000	-.482	-.784	1.000		
NVI	.073	.067	.204	-.069	.175	-.001	-.077	.911	.938	.000	.000	.514	.627	-.881	1.000	
NVI*VIMSO	.013	.068	.179	-.042	.142	-.001	-.060	.659	.707	-.074	.041	-.145	.880	-.690	.739	1.000

< Table 5> Correlation matrix of variables for the carriage of non-vertically start-up cable networks

	INDNET	CAPA	BSUB	RATE	DMA1	DMA2	DMA3	NOSYS	HSIZE	TCOST	AGE	VII	NVI
INDNET	1.000												
CAPA	.184	1.000											
BSUB	.063	.232	1.000										
RATE	.118	.175	.055	1.000									
DMA1	.025	.271	.259	.051	1.000								
DMA2	-.017	-.032	.003	-.056	-.284	1.000							
DMA3	-.012	-.089	-.131	-.055	-.454	-.316	1.000						
NOSYS	-.049	-.031	.117	-.055	.099	.016	-.054	1.000					
HSIZE	-.015	.075	.233	-.046	.176	.016	-.079	.919	1.000				
TCOST	.116	.000	.000	.000	.000	.000	.000	.000	.000	1.000			
AGE	.268	.000	.000	.000	.000	.000	.000	.000	.000	.013	1.000		
VII	.006	.150	.285	-.017	.222	-.001	-.087	.739	.874	.000	.000	1.000	
NVI	-.014	.067	.204	-.069	.175	-.001	-.077	.911	.938	.000	.000	.881	1.000

<Table 6> Parameter Estimates of Logit Analysis for Vertically Integrated Start-up Cable Networks

DV: $VINET_{il}$	Model 1	Model 2	Model 3	Model 4	Model 4	Model 6	Model 7	Model 8
R^2	.210	.210	.210	.211	.208	.208	.208	.209
$\ln CAPA_l$	1.749 (12.33)***	1.749 (12.33)***	1.755 (12.37)***	1.751 (12.37)***	1.814 (12.77)***	1.814 (12.77)***	1.817 (12.76)***	1.812 (12.75)***
$\ln BSUB_l$	.064 (2.04)**	.064 (2.04)**	.066 (2.11)**	.061 (1.94)*	.092 (3.20)***	.092 (3.20)***	.098*** (3.49)***	.084 (2.95)***
$\ln HSIZE_l$	.059 (1.49)	.059 (1.48)	.071 (1.86)*	.047 (1.21)				
$\ln NOSYS_l$	-.131 (-3.53)***	-.131 (-3.53)***	-.145 (-3.91)***	-.132 (-3.56)***				
$\ln RATE_l$	.882 (4.77)***	.882 (4.77)***	.897 (4.79)***	.890 (4.80)***	.851 (4.66)***	.851 (4.66)***	.855 (4.66)***	.840 (4.64)***
$DMA1_l$	-.320 (-2.91)***	-.320 (-2.91)***	-.320 (-2.90)***	-.320 (-2.90)	-.278 (-2.52)**	-.278 (-2.52)**	-.275 (-2.48)**	-.275 (-2.49)**
$DMA2_l$	-.071 (-.570)	-.071 (-.570)	-.071 (-.570)	-.074 (-.59)	-.051 (-.40)	-.050 (-.40)	-.050 (-.40)	-.053 (-.42)
$DMA3_l$	-.133 (-1.34)	-.133 (-1.34)	-.133 (-1.34)	-.134 (-1.35)	-.110 (-1.10)	-.110 (-1.10)	-.109 (-1.09)	-.116 (-1.11)
$\ln AGE_i$	1.017 (16.02)***	1.017 (16.01)***	1.013 (15.95)***	1.017 (16.01)***	1.013 (16.00)***	1.013 (16.00)***	1.012 (15.97)***	1.016 (16.03)***
$\ln TCOST_i$	1.153 (18.16)***	1.153 (18.15)***	1.158 (18.20)***	1.155 (18.22)***	1.151 (18.14)***	1.151 (18.14)***	1.153 (18.11)***	1.149 (18.11)***
VI_{il}	.998 (7.11)***		.979 (7.60)***	1.062 (7.61)***	.826 (7.78)***		.808 (7.95)***	.844 (8.04)***
$VIMSO_{il}$	.283 (2.36)**	-.715 (-7.92)***			.151 (1.80)*	-.675 (-7.58)***		
$NONVIMSO_{il}$		-.999 (-7.11)***				-.827 (-7.78)***		
$VIMSO_{il} * NVI_l$			.020 (2.80)***	.073 (2.98)***			.008 (1.7)*	.055 (2.62)***
$(VIMSO_{il} * NVI_l)^2$				-.002 (-2.47)**				-.002 (-2.43)**
Intercept	-17.691 (-22.71)***	-16.688 (-20.85)***	-17.877 (-23.21)***	-17.568 (-22.43)***	-17.866 (-23.31)***	-17.037 (-22.30)***	-17.936 (-23.30)***	-17.759 (-22.98)***
N	11,316	11,316	11,316	11,316	11,316	11,316	11,316	11,316

t-statistics in parenthesis. ***, **, and * refer to significant at the 1 percent, 5 percent and 10 percent level,

<Table 7> Parameter Estimates of Logit Analysis for Non-vertically Integrated (independent) Cable Networks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
DV: $INDNET_{il}$	WITH COMPLETE SAMPLE				WITHOUT FOX NEWS CHANNEL			
$\ln CAPA_l$	1.511 (10.21)***	1.515 (10.24)***	1.596 (10.80)***	1.587 (10.73)***	1.605 (9.97)***	1.598 (9.95)***	1.706 (10.66)***	1.672 (10.48)***
$\ln BSUB_l$	.054 (1.43)	.055 (1.46)	.076 (2.24)**	.071 (2.19)**	.098 (2.37)**	.101 (2.44)**	.131 (3.56)***	.134 (3.77)***
$\ln HSIZE_l$	.028 (.63)	.030 (.72)			.050 (1.07)	.062 (1.37)		
$\ln NOSYS_l$	-.142 (-3.30)***	-.149 (-3.47)***			-.181 (-3.93)***	-.167 (-3.64)***		
$\ln RATE_l$	1.139 (5.30)***	1.154 (5.26)***	1.067 (5.09)***	1.053 (5.03)***	1.274 (5.37)***	1.227 (5.38)***	1.188 (5.34)***	1.139 (5.19)***
$DMA1_l$	-.465 (-3.89)***	-.467 (-3.91)***	-.409 (-3.40)***	-.410 (-3.42)***	-.507 (-3.95)***	-.493 (-3.86)***	-.439 (-3.39)***	-.434 (3.28)***
$DMA2_l$	-.334 (-2.45)***	-.333 (-2.44)***	-.307 (-2.21)***	-.309 (-2.23)**	-.354 (-2.41)**	-.353 (-2.42)**	-.321 (-2.15)**	-.329 (-2.22)**
$DMA3_l$	-.215 (-1.99)**	-.215 (-1.99)**	-1.91 (-1.74)*	-.193 (-1.75)*	-.193 (-1.67)*	-.193 (-1.68)*	-.164 (-1.39)	-.170 (-1.46)
$\ln AGE_i$	2.337 (28.97)***	2.337 (28.96)***	2.323 (29.00)***	2.324 (29.00)***	2.587 (28.84)***	2.589 (28.26)***	2.565 (28.29)***	2.574 (28.32)***
$\ln TCOST_i$	.480 (21.40)***	.480 (21.40)***	.477 (21.33)***	.477 (21.33)***	.438 (18.79)***	.439 (18.77)***	.434 (18.78)***	.436 (18.74)***
VII_l	.117 (.93)		-.170 (-1.91)*		-.115 (-.87)		-.430 (-4.36)***	
NVI_l		.009 (1.23)		-.012 (-2.21)**		-.021 (-2.58)***		-.039 (-6.47)***
Intercept	-15.562 (-18.99)***	-15.639 (-19.27)***	-16.037 (-19.96)***	-15.923 (-19.81)***	-17.033 (-18.87)***	-17.060 (-19.28)***	-17.483 (-19.63)***	-17.213 (-19.66)***
No. of Obs	9,430	9,430	9,430	9,430	8,487	8,487	8,487	8,487
R^2	.176	.176	.171	.171	.207	.208	.201	.204

t-statistics in parenthesis. ***, **, and * refer to significant at the 1 percent, 5 percent and 10 percent level,