

Price discrimination under convergence telecommunication market: in Korean broadcasting and telecommunication industry

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Abstract

We are expecting that QPS(Quadruple-Play Service) emerge in the near future which is combined mobility with TPS(Triple-Play Service). AS TPS(Triple-Play Service) provides picture, data and telephone service together, telecommunication industry will converge faster than expected. This studies examine the price regulation of SO bundling service and market structure regulation from the integration among SO, PP and NO. Price discrimination under convergence service is somewhat increasing customer positive surplus and gains from the supplier's efficiency.

This research examines particularly the concept and definition of price discrimination under convergence telecommunication industry and concludes that price discrimination and regulations under telecommunication market are related to sound competition between service providers and encourage the effective policy making. Therefore, the direct effect of price discrimination to various groups of consumers and the relationship with entry barrier should be considered according to the standard of publicity.

Keywords: Korean Broadcasting Industry, Convergence, technical efficiency, cournot oligopoly game theory

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1. Introduction

This study addresses media industry's responses to the convergence of broadcasting and telecommunications in Korea. In Korea, we can find out that broadcasters and telecommunication companies aggressively enter into the convergence industry. But their road to the convergence is different in terms of their strategies and core competences. Terrestrial broadcasters are focusing on the information providers. They have strategies to lead the content industry as a whole. Also they extend their areas to the integration of information provider and service provider. Meanwhile, cable TV operator is the leading industry sector to cope with the convergence environment. They have positioned information provider, information service provider, and information network provider altogether. Telecommunication companies expand their competences to the integration of service provider and network provider on top of their network strength. This situation means that, vertical integration of media and telecommunications industry, which had banned so far, could be accelerated in the near future. For satellite DMB service, TU media has provided the DMB service from the end of 2004 with business permission regulation. DMB service seems to have different perspective and evaluation for the future. They said that broadcasting market is already excessive competition and saturated. On the other side, the premium service for the metro life cycle can be the new demand for the market. In 2004, Korea Broadcasting Committee didn't permit the rebroadcast the terrestrial program to satellite DMB service. The broadcasting regulation should make the fair competition between the existed groups and the new media service. Even though, the regulation may be stricter to the new emerging service.

This topic is that Price discrimination is 'A seller charging competing buyers different prices for the same "commodity" or discriminating in the provision of "allowances" - compensation for advertising and other services -- may be violating the Robinson-Patman Act'. This kind of price discrimination may hurt competition by giving favored customers an edge in the market that has nothing to do with the superior efficiency of those customers. However, price discriminations generally are lawful, particularly if they reflect the different costs of dealing with different buyers or result from a seller's attempts to meet a competitor's prices or services. Price discrimination also might be used as a predatory pricing tactic -- setting prices below cost to certain customers -- to harm competition at the supplier's level. Antitrust authorities use the same standards applied to predatory pricing claims under the Sherman Act and the FTC Act to evaluate allegations of price discrimination used for this

purpose. A tie-in sale results from a contractual arrangement between a consumer and a producer whereby the consumer can obtain the desired good (tying good) only if he agrees also to purchase a different good (tied good) from the producer. While the courts have usually considered such pricing arrangements as an extension of monopoly from the market for the tying good to the tied-good market.

The purpose of this study is to investigate positive effect and negative effect of price discrimination under convergence telecommunication market. With price discrimination example on the telecommunication market, we need to research that what kind of factors we need to judge the standard of unfair and illegal price discrimination. For example, Cable TV industry is one of representative price discrimination with tying. Customer chooses the Cable TV provider by the programs which do not want either. Finally, the research will verify the relationship with price discrimination and entry barrier. Such as, if firms did price discrimination by the categorized customer sector, this would be impact on the convergence telecommunication industry's entry barrier?

Overall, the impact of emerging new media service in broadcasting industry effect by policy regulation. The broadcasting policy changes such as limited program time for specific sector, M&A in Cable TV operators and fair competition regulation seem to effect directly to the firm's technical efficiency and productivity. However, we realize that productivity growth was driven mainly by technical efficiency change. With respect to scale effect its contribution to total factor productivity growth is very small. This result suggests that fair regulation for new emerging service will increase growth of broadcasting industry as a whole.

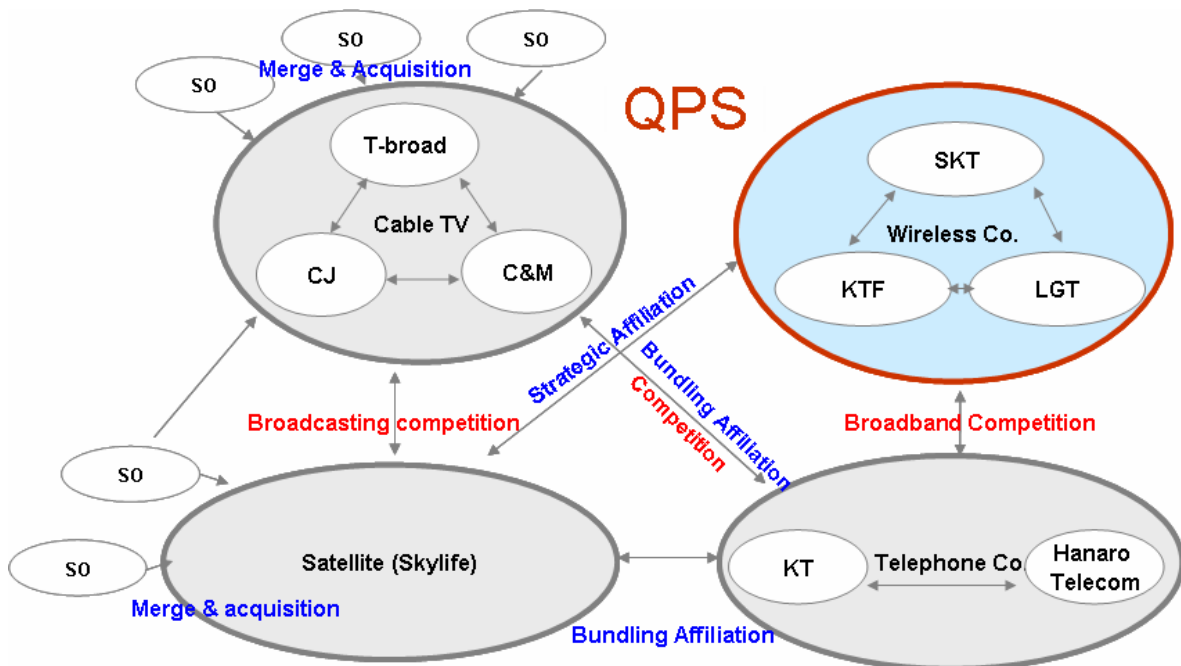
The remainder of this study is organized into several sections. In the following section, we mention that the research background of current status and research purpose of this topic. We summarize the literature and present our hypotheses. We then describe our research methodology and present our results. Finally, we present our discussion, the limitations of our study, and opportunities for future research.

2. Research background and current status of Korean convergence broadcasting and telecommunication industry

2.1 Market status between broadcasting operators and telecommunication company

Korea broadcasting industry mainly categorized four sectors: Cable TV, terrestrial broadcasting, satellite broadcasting, and Digital multimedia broadcasting (DMB). Terrestrial broadcasting can be divided into two parts; television broadcasting and radio broadcasting. Television broadcasting part has KBS, SBS, EBS, and regional terrestrial broadcasting. Satellite broadcasting is the Skylife that started in March 2002. Also, Digital multimedia broadcasting, that main purpose of this service is the mobile telecommunication with multi-channel, is TU media from May 2005.

Figure 1. Current status of Korean convergence broadcasting and telecommunication industry



Refer to Oh(2007)

Many challenges in Korea broadcasting market in these days; the major change is the digitalization. In 2004, there emerged new media sector called satellite broadcasting. At that time, stable Cable TV operators gave their subscriber to satellite broadcasting operators. This phenomenon will definitely go on in convergence era. For recent news, cable TV operators

criticised and worried that market expanding strategy of terrestrial broadcasting operators and satellite operators is extending the broadcasting time and entering the program provider (PP) market. Extending the broadcasting time will give more monopolistic power for terrestrial broadcasting operators and entering the program provider (PP) of big broadcasting companies such as KBS will have more power to have entry barrier. So they want to request the strict regulation with detail part of the new emerging phenomenon. The following table describe comparison between current between cable TV operators and satellites TV (Skylife).

Table 1. Comparison between Cable TV operator and Satellite TV

Category		Cable TV operator	Satellite TV
Channel Management		PP program, Terrestrial broadcasting and Foreign program retransmission	
Terrestrial retransmission		Retransmission of all Terrestrial Broadcasting Program	
Business Area		77 national-wide business area	Cover whole nation
# of Business		119 (Based on '05.6)	1 (Skylife)
# of subscribers (Based on '05.6)		11,694,162 (86.5%)	1,825,538 (13.5%)
Sales Revenue ('04)		1,347,900 million (84.1%)	255,000 million (15.9%)
Subscription Fee (By month)	CATV	Basic 4,000 won Economy 6,000 won 8,000 won Standard 15,000 won	Basic 10,000 won economy 14,000 won Premium 20,000won
	CATV+Internet	25,000 won	Pure Bundling without price discount
Setup*		30,000 ~ 60,000 won	90,000 won
Permission		Korea Broadcasting Committee recommendation and Information and Communication Ministry permission	

* Discount of setup fee is different by operator and subscription period
 * Refer to Fair Trade Commission 2005 data

2.2 Current status of bundling service in Korea and US

In Korea, the telecommunication company tries to find the new source of profit with digitalizing the internet television service such as IPTV. Also the technology with broadcasting converged IP-based digitalization. Customers' convergence service demand needs one-stop service with lower charges than before. So the supply side could not get around this bundling service demand. In other hand, Cable TV system operators provide the CATV + Internet bundling service and the charges is offered 18% discount rate. Below table shows the bundling service and characteristic of telecommunication bundling service which is provided by KT, DACOM and HANARO telecom.

Table 2. Bundling service and characteristics of Korea company

Company	Bundling Service	Remark	No. of subscriber (Oct.06)
KT	One phone (Local + Mobile)	No discount rate	174 Thous.
KT	Netspot Wing (Wireless Lan + Mobile)	10% discount of each basic subscription	100 Thous.
Hanaro	Plus Service (Local phone + BcN internet)	Exemption Subscription fee	1,804 Thous.
Dacom	Local phone + BcN internet	Exemption Subscription fee	1 Thous.

Data : S.T. Kim (2007)

Introducing IPTV service, US wire line telecommunication operators enter the MVPD(multichannel video programming distributor) market and compete with Cable TV operators which have competitive market power with TPS(Triple Play Service). Competition is excessively growing among these parties till quite recently. M.S. Oh (2007) introduces the US primary TPS bundling service.

Table 3. Bundling service and base rate of US. Company

Service Name		Service Contents	Charges	
Verizon Freedom	Double Freedom	Wire Telephone + Internet (Max 3Mbps), One among DirecTV, Mobile communication service	\$64.99~74.99/Month	
	Triple Freedom	Wire Telephone, Internet + One among DirecTV, Mobile communication service	\$94.99~104.99/ Month	
	Ultimate Freedom	All service for Wire Telephone + Internet (Max 3Mbps) + DirecTV + Mobile communication service	\$134.99~144.99/ Month	
Comcast	Pivot	Mobile to Home Calling	Charges	Limit

³ Comcast mobile TV, Mobile E-mail, Mobile web, Sprint music premier, Sprint navigation, Sprint picture mail, Sprint on demand

	Plus	Linked Voice Mail	\$114.99/ Month	2000 minutes
		Home Forwarding	\$214.99/ Month	Unlimited
		Pivot Multimedia ³		

Data: Strabase (2007. 2. 14)

KISDI (Korea Information Society Development Institution) forecast that various types of bundling service will be sold in near future with WiBro and VoIP service.

3. Model Specification

In this study, game theoretic model of oligopoly is used. When monopoly company decides tying at 1st stage, competitor decides to enter market and then 3rd stage price competition among market. The formal process of this model, the competitors enter the complementary product market at 2nd stage. When the competitor invest the money and enter the complementary product market, we will find the Nash equilibrium at 1st stage. This is the basic assumption of this game theoretic model.

A. Demand function $P = a - Q^4$ (Linear Cournot model)

B. K (Entry Cost) = 0: This industry base on economic of scale.

C. 4 Player = 4 sector

- i. Cable TV Operators (MSO and SO) : 119 – provide basic service
- ii. Satellite service : 1 – provide basic and premium service
- iii. Terrestrial broadcasting 16 – KBS, MBC, EBS, SBS and local station
- iv. Potential Incumbent player : IPTV(KT), DMB service (TU media)

D. Type of channel bundling : Basic service, Premium service(Multi-channel pay)

E. Four players have the competition relationship inside broadcasting Industry.

F. Goods from the player is somewhat substitutes, Q (quantity) is channel diversity.

G. Cost function is used from the whole broadcasting industry. This study applies the stochastic frontier method to derive the Korea convergence telecommunication market cost function.

⁴ John W. Mayo; Yasuji Otsuka “Demand, Pricing and regulation: Evidence from the cable TV industry” the RAND journal of economy Vol.22, No. 3 (Autumn, 1991), pp 396~410 Using the two key variables are mentioned. Two variable for demand function is channel diversity and difference between basic service price and premium service price.

In this study, traditional Cournot's oligopoly Nash equilibrium is used for oligopoly game theory: Pair (q^*1, q^*2) of outputs such that each firm's action is a best response to the other firm's action or $q^*1 = b1(q^*2)$ and $q^*2 = b2(q^*1)$

$$\text{Max}_{q_i} \pi^i(q_1, \dots, q_n; k_i) = P(Q)q_i - C^i(q_i; k_i), \quad Q = \sum_{i=1}^N q_i \quad (1)$$

From the basic assumption A) $P = a - Q$ ($Q = q^*1 + q^*2$: q^*1 channel service q^*2 : bundling service) and $p = ((p^*c, q^*c) + (p^*b, q^*b)) - c(q)$.

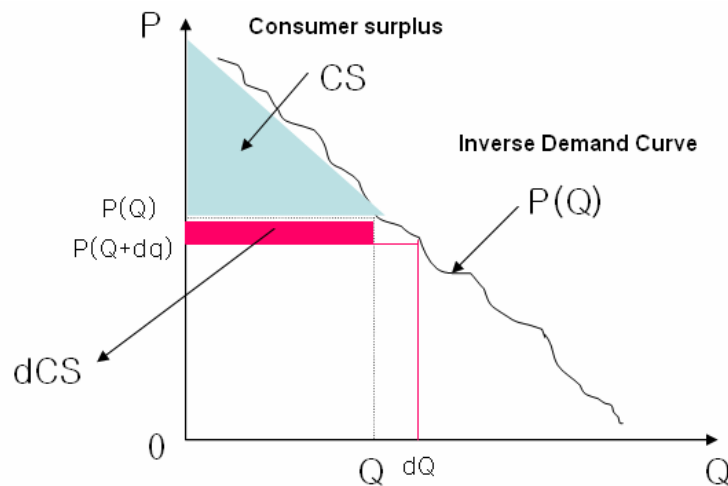
$$\frac{\partial \pi^i}{\partial q_i} = p(Q) - p'(Q)q_i - c(q_i)$$

Solution: $q_1 = (a - c - q_2)/2$ and $q_2 = (a - c - q_1)/2$

$$p^*1 = P1q1 - cq1 = (P1-c)q1 = (P1-c)((a - c - q1)/2) = ((a-c)/3)^2$$

$$p^*2 = P2q2 - cq2 = (P2-c)q2 = (P2-c)((a - c - q2)/2) = ((a-c)/3)^2$$

Figure 2. Consumer surplus and Inverse Demand Curve



Inverse demand function represent ' $P = a - Q$ '. Inside the $P(Q)$, consumer surplus(CS) is derived as gray part. And social welfare function is made with each firms' profits with consumer surplus. The formula is derived as follows :

$$CS(Q) = \int_0^Q P(s)ds - P(Q)Q$$

$$dCS = P(Q)dQ - [P(Q)dQ + P'(Q)dQ] = -QdP$$

$$\frac{\partial \pi^i}{\partial q_i} = P(Q) + P_2(Q)q_i - C_{iq}(q_i; k_i) = 0$$

$$SW(q_1, \dots, q_N) = CS(Q) + \sum_{i=1}^N \pi^i(q_1, \dots, q_N)$$

$$= \left[\int_0^Q P(s) ds - P(Q)Q \right] + \sum_{i=1}^N [P(Q)q_i - C^i(q_i)]$$

$$= \int_0^Q P(s) ds - \sum_{i=1}^N C^i(q_i)$$

$$SW = CS + \sum_{i=1}^N \pi^i$$

To calculate the each case's social welfare, this study uses the above formula.

4. Data and Empirical Results

4.1. Data

Our unbalanced panel data from year 2000-2005 are obtained from the maximum number of 144 cable TV system operator and satellite TV firms. The panel includes, overall, 658 observations over 6 years (2000-2005). The sample covers all broadcasting firms from broadcasting industry survey and research. All firms' data are taken from their financial report. In our analysis, we apply one outputs of sales cost for each TV service company. The input used in the analysis includes the number of employee, capital, material cost. Capital and material cost are measured in monetary values and deflated to fixed 2000-prices. The number of employee is measured in number. Table 1 presents the descriptive statistics of the data set.

Table 1 shows that mean of sales revenues(oy) were 3.3 billion Won, respectively with employee(ox1) of 159, capital(ox2) of 4.3 billion Won and material cost(ox3) of 2.4 billion Won. The minimum of outputs and inputs variables were 28.5 million Won in sales revenues(oy), 3 staff in employee(ox1), 11.1 million Won in capital(ox2), 13.1 million Won of material cost(ox3) respectively. The maximum of outputs and inputs variables were 125.1 billion Won in sales revenues(oy), 5479 staff in employee(ox1), 116.7 billion Won in capital(ox2), 93.5 billion Won of material cost(ox3) respectively.

Table 4. Descriptive statistics of the sample data set

All Year from 2000 – 2005, obs=691					
Variables	Unit	Mean	Std dev	Minimum	Maximum
Outputs					
Sales Revenue (Y)	(1,000 won)	33,872,672	129,219,501	285,560	1,251,871,519
Inputs					
Employee (L)	number	159	567	3	5479
Capital (K)	(1,000 won)	43,123,121	122,566,825	111,435	1,167,432,269
Material cost (M)	(1,000 won)	24,465,707	99,762,698	131,497	935,084,954

For regression analysis, it is important that the regressors correlate with the dependent variable, but the co-linearity among independent variable may make the parameter insignificant, confounded and unstable.

4.2. Empirical Results

The parameter estimates Analyses of the result presented below are based on the specification and estimation of a stochastic frontier translog function model. The estimate for the variance parameter, γ , is close to one, which indicates that the inefficiency effects are likely highly significant in the analysis. Estimated parameters of the output distance function describe above are presented in Table 2.

Table 5. Estimated parameters of translog cost function, NT=658 observations

Variable	Parameter	Coefficient	Std err	t-ratio
ln(Y)	β_0	0.10897	0.1027	10.6
ln(L)	β_1	0.17022	0.1907	8.924
ln(K)	β_2	0.38723	0.1525	2.539
ln(M)	β_3	-0.97453	0.1455	-6.693
Satellite	δ_0	-0.19669	0.4947	-3.975
CableTV	δ_1	0.39675	0.1069	3.71
DMB	δ_2	0.19282	0.4048	4.762
Year	δ_3	0.4285	0.8854	4.839
Type	δ_4	-0.72988	0.1452	-5.025
	γ	0.60991	0.1056	2.84

Log likelihood test value is 10.554 (5% significant level)

Various test of null hypotheses for the parameters in the frontier production functions and in the inefficiency model are performed using the generalized likelihood ratio test defined by $\lambda = -2\{\log L(H_0) - \log L(H_1)\}$ where $L(H_0)$ and $L(H_1)$ denote the values of the likelihood function under the null (H_0) and alternative (H_1) hypotheses, respectively. If the null hypothesis is true, the test statistic has approximately a χ^2 or a mixed χ^2 distribution with degrees of freedom equal to the difference between the parameters involved in the null and alternative hypotheses. The first null hypothesis, which specifies that technical progress, is neutral. This is rejected at 5% level of significance. The second null hypothesis specifies that the inefficiency effects are not a Cobb-Douglas function of the characteristic variables. This null hypothesis is also rejected at the 5% level of significance. Thus, the Cobb-Douglas production function is not an adequate specification for the Korea Broadcasting industry, given the assumption of the translog stochastic frontier production function model. The third null hypothesis, that there is no technical change. This null hypothesis is also rejected at the 5% level of significance. This implies the existence of non-neutral technical progress as a whole, given the specified production model.

Market status result In Korea, the number of subscriber is increasing from 10 million to 11 million people. The bundling service’s number of subscriber is 2.5 million to 2.9 million. And the price of subscription is different by the area-type whether competitive or monopoly. Price of channel bundling is 5.6 USD for competitive and 7.0 USD for monopoly. Table 6 represents comparison between cable TV and satellite TV service by price and channel. We can figure out monopoly area price per channel is higher than competitive area.

Table 6. Analysis on cable TV market based residual sectors.

Variable	Market specific		Sector specific	
	CATV	Satellite	monopoly	competitive
Price by one channel	108.8 KW	124.0 KW	119.9 KW	103.4 KW
Ratio of competition	38.6 %	24.2 %	-	-
# of Channel	52.8	48.4	49.4	54.8
Monthly subscription	5,361 KW	5,728 KW	5,628 KW	5,273 KW
Rate of satellite subscription	-	-	22.6 %	13.5 %

Refer to “An empirical study on the competition between cable television and direct broadcast satellite” I.C. Lee C.H. Yoon, D.H. Lee. Korean telecommunication policy Review

Table 7 tells the each service number of subscriber and subscription of service. Competitive area means multi CATV system operators base. In this area, MSO has 58 number of channel and 5,787 won average subscription fee. Monopoly area means one CATV system operator. In the monopoly area, CATV SO(system operator) has 53 number of channel and 6,652 won average subscription fee. Satellite broadcasting service provides the whole nation so it doesn't divided into competitive area and monopoly area.

Table 7. Number of subscriber and price of subscription of service.

		# of subscriber		Price of subscription	
		2005	2006	competitive	monopoly
Cable TV	Channel (# of channel)	10,840,000	11,970,000	5,361 KW (58) (5.6 USD)	6,652 KW (53) (7.0 USD)
	Bundle	2,560,000	2,910,000	23,361 KW (24.5 USD)	24,652 KW (25.9 USD)
	Channel	1,825,240	1,902,920	14,000 KW (14.7 USD)	14,000 KW (14.7 USD)
Satellite	Bundle	814,000	788,000	30,000 KW (31.5 USD)	30,000 KW (31.5 USD)
	DMB Basic	370,754	539,785	32,300 KW (34 USD)	32,300 KW (34 USD)

Return to Scale and Elasticity Table 8 represents the returns to scale (RTS) and elasticity of each factor for some selected time periods. For the total sample, the average estimate of RTS is 1.013. RTS continuously decrease and thus production technology exhibits increasing return to scale for each sector.

Table 8. Return to Scale and Elasticity by year and type; terrestrial, satellite, cable TV, and DMB service.

RTS	Total	Elasticity	Labor	Capital	Sales cost
	Mean		Mean	Mean	Mean
	Std.		Std.	Std.	Std.
2000	1.0244 (>1)	2000	0.3658	0.0545	0.6042
	0.0208		0.123	0.0472	0.0966
2001	1.0217 (>1)	2001	0.3778	0.0608	0.583
	0.0194		0.1452	0.0378	0.1328
2002	1.0154 (>1)	2002	0.344	0.0758	0.5956

RTS	Total		Labor	Capital	Sales cost
	Mean	Elasticity	Mean	Mean	Mean
	Std.		Std.	Std.	Std.
	0.0179		0.1234	0.048	0.1228
2003	1.0142 (>1)	2003	0.3458	0.0783	0.5901
	0.0156		0.1339	0.0403	0.1418
2004	1.007 (>1)	2004	0.3297	0.0969	0.5804
	0.0163		0.1346	0.0414	0.1386
2005	1.0012 (>1)	2005	0.3103	0.1082	0.5828
	0.0156		0.1434	0.0383	0.1419

Social Welfare Analysis Table 5 calculation is derived from appendix 1 table result. (see appendix 1) Channel bundling and internet service bundling in competition area, with bundling service social welfare is higher than without bundling. For monopoly area, without bundling service social welfare is higher than with bundling. This means misuse of monopolistic power. Competition with incumbent and potential player, the results will be same by sector.

Table 9. Social Welfare Analysis of channel bundling and Internet service bundling

Player & Strategy Competition and Monopoly			Satellite Service		
			Channel Bundling with Premium service	Skylife + Internet (Megapass, Netspot with Pure bundling)	Potential Incumbent IPTV, DMB etc
CATV	Competition Area	Channel Bundling	142,420,242,302	139,419,362,302	131,941,576,876
		CATV+INT (Price discount)	146,229,582,302	143,228,702,302	135,750,916,876
	Monopoly Area	Channel Bundling	157,873,512,302	154,872,632,302	147,394,846,876
		CATV+INT (Price discount)	149,986,392,302	146,985,512,302	139,507,726,876

In addition, this incentive for service bundling is reduction of transaction cost, marketing expense. Also, its effect on the incumbent can decrease of incumbent's profit and existed company may foreclosure the market at the end.

5. Discussion of the Results and Policy Implications

This study addresses media industry's responses to the convergence of broadcasting and telecommunications in Korea. In Korea, we can find out that broadcasters and telecommunication companies aggressively enter into the convergence industry. But their road to the convergence is different in terms of their strategies and core competences. Terrestrial broadcasters are focusing on the information providers. They have strategies to lead the content industry as a whole. Also they extend their areas to the integration of information provider and service provider. Meanwhile, cable TV operator is the leading industry sector to cope with the convergence environment. They have positioned information provider, information service provider, and information network provider altogether. Telecommunication companies expand their competences to the integration of service provider and network provider on top of their network strength.

This situation means that, vertical integration of media and telecommunications industry, which had banned so far, could be accelerated in the near future. For satellite DMB service, TU media has provided the DMB service from the end of 2004 with business permission regulation. DMB service seems to have different perspective and evaluation for the future. They said that broadcasting market is already excessive competition and saturated. On the other side, the premium service for the metro life cycle can be the new demand for the market. In 2004, Korea Broadcasting Committee didn't permit the rebroadcast the terrestrial program to satellite DMB service. The broadcasting regulation should make the fair competition between the existed groups and the new media service. Even though, the regulation may be stricter to the new emerging service.

In this paper, price discrimination without product differentiation causes the misuse of the monopolistic power in the convergence market. Increase the number of subscriber from price discount of bundling. The major results and analysis derived from the game theory with each cost and demand function are as follows. First, emerging new service sector could cause to decrease the whole productivity because of its RTS. When return to scale of one industry is over 1, it said increasing return to scale. This broadcasting industry need the high fixed cost for the initial investment, so that larger the scale of production lead to increasing return to scale because of the decreasing costs to scale.

Second, channel bundling and internet service bundling in competition area, with bundling service social welfare is higher than without bundling. For monopoly area, without

bundling service social welfare is higher than with bundling. Likewise, H.S. Jeon (2005) found that the introduction of competition to the cable television market in Korea resulted in providing subscribers cheaper service fee, more channels, and even channel diversity; however, this competition reduced the firm performance considering the aspect of business. With sound competition among the operators and parties, service bundling such as TPS, QPS service will be positive for customer and supply side. And this service can support the value-added service in this industry.

Third, bundling service is the major stream in broadcasting and telecommunication convergence era. Therefore, it should be allowed any type of service bundling but the regulation should be restrained the monopolistic market foreclosure in the end. What can be the restrained the monopolistic market foreclosure regulation? It can be done by fair competition ACT. In detail, bundling service pricing has regulated the discount rate limit and increasing subscription charges. Also, there should be easier entry barrier regulation for only one service operators than bundling service operators.

Overall, Price discrimination without product differentiation causes the misuse of the monopolistic power in the convergence market. Increase the number of subscriber from price discount of bundling. It leads higher the monopolistic power in the CATV and Internet market. This caused market foreclosure in the end. For example, in doing Home networking service, one player may be the main hub system for the multi-play service. So the main hub system will grow as monopolistic power in this convergence industry. Bundling product has to focus on not price discount as predatory pricing but value-added service. In the past, the regulation focuses on supplier and business side for scale of economy. But current convergence market regulation should be changed for the customer side and fair competition between existed player and incumbent.

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Appendix 1.

Figure 5. Demand function & Cost function result by year

(unit: won)

		Demand function		Cost function ($y = (K+eff*salary)+(L*eff)+(M*eff)$)				
		P*Q Competitive	P*Q Monopoly	Sales Cost	Labor	Capital	Material	cost function result
Cable TV (Channel)	2005	58,113,240,000	72,107,680,000	9,490,083	51	22,944,732	5,509,268	413,337,527
	2006	64,171,170,000	79,624,440,000	12,258,708	58	31,285,400	7,254,130	465,918,420
Cable TV (Bundle)	2005	59,804,160,000	63,109,120,000	9,490,083	51	22,944,732	5,509,268	413,337,527
	2006	67,980,510,000	71,737,320,000	12,258,708	58	31,285,400	7,254,130	465,918,420
Satellite (Channel)	2005	25,553,360,000	25,553,360,000	220,095,635	296	79,516,021	317,134,093	2,172,435,986
	2006	26,640,880,000	26,640,880,000	294,488,589	280	49,585,455	336,042,151	2,025,995,157
Satellite (Bundle)	2005	24,420,000,000	24,420,000,000	220,095,635	296	79,516,021	317,134,093	2,172,435,986
	2006	23,640,000,000	23,640,000,000	294,488,589	280	49,585,455	336,042,151	2,025,995,157
DMB	2005	11,975,354,200	11,975,354,200	-	-	-	-	-
	2006	17,435,055,500	17,435,055,500	18,274,485	115	89,869,749	89,675,429	923,840,780