行政院國家科學委員會專題研究計畫　成果報告

有線電視消費者對分級付費制度接受意願之探討

計畫類別：個別型計畫
計畫編號：NSC91-2416-H-004-037-
執行期間：91 年 08 月 01 日至 92 年 07 月 31 日
執行單位：國立政治大學經濟學系

計畫主持人：王國樑

報告類型：精簡報告

處理方式：本計畫可公開查詢

中　華　民　國 92 年 8 月 1 日

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摘要

根據有線電視戶與業者行為特性，本文首先建立一有線電視收視行為理論模型；其次，透過數學推導，獲得收視戶對分級付費制度接受意願之二項式 logit 模型；然後，利用西元 2000 年對台灣有線電視收視戶的電話抽樣資料，就上述二項式 logit 模型進行估計，實證結果顯示，就收視戶對分級付費制度的接收意願而言，收視戶的年齡、教育程度與現行月收視費具有正向影響；而擁有專職工作、每日收視時間與偏好頻道數則具有負向影響。因此，為提高分級付費制度的可行性，本文進一步建議：新聞局應加強有關分級付費制度的宣導、有線電視頻道的分級愈細愈好、收視費上限管制至少在短期內仍應維持。

關鍵詞：分級付費制度、接受意願、二項式 logit 模型

Based on cable TV viewers' and firms' behavior characteristics, this paper first builds a theoretical model of the cable TV viewers' behavior. Then, a logit model of viewers' willingness to accept the tiering system is derived. By utilizing the survey data of Taiwan's cable TV viewers in 2000, the logit model is estimated. The empirical results show that age, education and monthly fee have positive, and having a regular job, daily watching hours as well as the number of favorite channels have negative impacts on viewers' willingness to accept the tiering system. To make the tiering system more feasible, it is suggested that the tiering system should be promoted more intensively; the number of tiers available to viewers should be as many as possible; and the price cap should be maintained at least in the short run.

Keywords: the Tiering System,Willingness to Accept, Binary Logit Model
JEL Classification:L82; M21; M31

1. Introduction

After the Cable Television Act of 1993 was published in Taiwan, the whole island has been segmented into 51 administrative districts. The number of cable TV firms went up from 57 in 1995 to 110 in 1997 and, then, went down to 65 in 2002 through integration or merger. Most districts are monopolistic markets except that there are 2 or 3 cable TV firms in some metropolitan areas. Along with ups and downs in the number of cable TV firms, monthly fees have significantly fluctuated. As a result, the prevailing bundling pricing system has been challenged[1], and the tiering system to solve the above problem has been suggested by most scholars and

[1] Until July 31, 2003, all channels have been bundled together as a package. Cable TV firms charge subscribers a single lump-sum monthly fee for the package.

government officers in the early 2000[2]. On the supply side, all of the cable TV firms welcome the tiering system due to that the system can make them become more flexible in choosing pricing strategies. However, on the demand side, cable TV viewers' preference for the system seems to be ambiguous because some of cable TV viewers are afraid that cable TV firms may raise monthly fees through the tiering system. Therefore, the tiering system has not been enforced until now because of the tremendous objection from consumers. In order to enhance the feasibility of the system, the cable TV viewers' personal characteristics, TV-watching behavior, knowledge of and willingness to accept the tiering system have to be clarified.

Since cable TV is one of the fastest growing industries in the U. S., economic studies of consumer demand for cable services are abundant.（Webb, 1983; Pacey, 1985; Mayo and Otsuka, 1991; Rubinovitz, 1993; Crandall and Furchtgott-Roth, 1996; Crawford, 2000）. For example, Webb（1983） applied the logit model to estimate the demand for cable services in Philadelphia during the period of 1980-1982 and found that the important factors to affect viewers' demand for basic service were the number of channels, program type and quality of signals carried by cable TV firms. Low-income neighborhood exhibited high levels of demand. If cable TV firms offered pay cable service, an increased price for basic service would reduce pay-cable revenues. The relationship between basic and pay cable services was complementary. Pacey (1985) used a logistic function to estimate the demand for basic cable TV services and found that introducing pay cable service would enhance viewers' desirability of cable TV services. Mayo and Otsuka（1991） used the two-stages least square method to estimate the demand and price equations as well as investigate the relationship among demand, pricing, and regulation of the cable television industry during the pre-deregulation period. They found that the demand for basic cable service was

[2] According to the tiering system, all channels will be grouped into different tiers. Besides that the price of the basic cable tier still has to be regulated, cable TV firms can choose different pricing strategies for other tiers.

more elastic in large urban market, but was inelastic in rural areas; the elasticity of demand for pay cable services is greater than unity; regulation had the effect of constraining basic prices. Regulation did not lead to economically efficient prices for cable services. Additionally, cable TV firms charged higher prices for pay cable services. Rubinovitz（1993）used the method of two-stages least square to study the fluctuation of basic cable price since the deregulation of basic rate and found that basic rate was increasing at outpacing the rate of inflation. The estimated demand elasticity of basic cable did not change after de-regulation, which imply that the increase of basic cable rate was induced by an increased exercise of market power after government eliminated the regulation of basic rate. Crawford（2000）utilized a discrete-choice differentiated-product model of demand for all kinds of cable television services to measure the benefits of households after the 1992 Cable Act was published, and found that there was no change in the welfare of household although government mandated cable price to reduce 10-17%. Nevertheless, no empirical studies in the existing international literatures have been found to investigate viewers' willingness to accept the tiering system. In Taiwan, only Liuo, Wang and Chen (2001) ever used the cross section analysis to investigate the feasibility of the tiering system. However, their empirical results are limited and of little use since the cross section analysis technique is restrained.

Because the existing literature on studying viewers' willingness to accept the tiering system is focused on the univariate or nonparametric analysis, and cable TV viewers' behavior can not be studied comprehensively, this study first attempts to build a theoretical model of cable TV viewers' behavior based on their behavior characteristics and the pricing strategy adopted by cable TV firms in Taiwan. Then, the logit model of cable TV viewers' willingness to accept the tiering system will be derived through the mathematical manipulation of the theoretical model. Based on the survey data of Taiwan's cable TV viewers in 2000, the logit model of cable TV

viewers' willingness to accept the tiering system will be estimated. Thereafter, the empirical results will be illustrated. Finally, the policy implications dependent upon the above results will be inferred.

In addition to the introduction, the remainder of the paper is organized as follows. The theoretical model of cable TV viewers' behavior is built and the logit model of cable TV viewers' willingness to accept the tiering system is derived in section 2. Section 3 describes data used in the empirical study and the interpretation of the empirical results. The final section concludes the paper.

2. Model Building

2.1 The Binary Choice Logit Model

With reference to McFadden（1974）and Morey（1981）, the binary choice logit model will be used to investigate determinants of viewers' willingness to accept the tiering system in this paper. Suppose that there are N viewers in the cable TV market, and cable TV firms offer viewers with two different pricing strategies: the tiering system and the prevailing bundling pricing system which bundles all channels together as a package. Hence, a viewer can select any kind of pricing system from a choice set C_n, where C_n is denoted as $\{X_1, X_2\}$; X_1 represents the tiering system; X_2 represents the prevailing bundling pricing system. We further assume that when the viewer n(n =1,…,N) chooses the pricing system Xi (i=1,2), then her or his utility function takes the following form

$$U_{ni}(X_i, S_n) = V_{ni}(X_i, S_n) + \varepsilon_{ni}(X_i, S_n) \quad (1)$$

where U_{ni} is the viewer n's utility level while she or he chooses the pricing system Xi (i=1,2); S_n represents the factors influencing the viewer n's selection of the two alternative pricing systems; V_{ni} is the deterministic component of U_{ni}; and ε_{ni} is the random component of U_{ni}, which is assumed to be independent and identical distributed with second order exponential distribution.

If $U_n(X_1,S_n) > U_n(X_2, S_n)$, the viewer n will prefer the tiering system to the prevailing bundling pricing system; on the contrary, if $U_n(X_2, S_n) < U_n(X_1, S_n)$, she or he will prefer the prevailing bundling

pricing system to the tiering system. Thus, the probability that the viewer n chooses the tiering system will be as follows:

$$P_n(X_1) = \text{Prob}[U(X_1, S_n) > U(X_2, S_n)]$$

$$= \text{Prob}[\varepsilon(X_2, S_n) - \varepsilon(X_1, S_n) < V(X_1, S_n) - V(X_2, S_n)] \quad (2)$$

For a binary choice situation, the absolute levels of V and ε do not matter; all that matter is whether the difference in V's is less than the difference of the ε's (Ben-Akiva and Lerman, 1985). Assuming that the values $\varepsilon_n(X_i, S_n)$ are independently identical distributed with Weibull distribution, Mcfadden(1974) found that

$$\text{Prob}[\varepsilon_n \le \varepsilon] = e^{-e^{-(\varepsilon+\cdot)}} \quad (3)$$

Then, equation (2) further becomes

$$P_n(X_1) = \text{Prob}[X_1 \mid S_n] = e^{V_n(X_1, S_n)} / e^{V_n(X_1, S_n)} + e^{V_n(X_2, S_n)}$$

$$= \frac{1}{1 + \exp[-\gamma_0 - \gamma_1 Z_1 - \gamma_2 Z_2 - \cdots - \gamma_k Z_k]} \quad (4)$$

where $Z_1, Z_2, \ldots, Z_k$ are the factors affecting the viewer n's willingness to accept tiering system.

By rearranging equation (4) and taking the natural logarithm of both sides, we then have

$$\ln \frac{P_n(x_1)}{1 - P_n(x_1)} = \gamma_0 + \gamma_1 Z_1 + \gamma_2 Z_2 + \cdots + \gamma_k Z_k \quad (5)$$

where $\frac{P_n(x_1)}{1 - P_n(x_1)}$ is the odds ratio of accepting the tiering system.

2.2 The Empirical Model of Willingness to Accept the Tiering System

Viewers' willingness to accept the tiering system depends on many factors. By referring to Webb (1983), Pacey (1985), and Crandall and Furchtgott-Roth (1996), they can be grouped into three broad categories as follows: 1. household characteristics (including (1) viewers' socioeconomic factors: gender, age, education, social status, household income, and household size and (2)consumption behavior factors: viewing time and the number of favorite channels); 2.cable TV firms' behavior (monthly fee of basic cable TV service; and 3. geographic characteristics (location and the expenditure of other entertainment)

of the community in which the household is located.

The theoretical foundation of each explanatory variable is illustrated as follows. Socioeconomic variables, which are often strongly related to viewers' demand, can be used to segment consumer markets and distinguish between different kinds of viewers' attributes. However, there exist substantial viewing variations among socioeconomic groups（Tavakoli and Cave, 1996）. Differences in viewers' characteristics may lead to significant differences in the likelihood of their willingness to accept the tiering system. In general, gender variable has long been applied in business research. In the TV service market, female viewers tend to watch more than male viewers (Tavakoli and Cave, 1996). Female viewers' preference on the channels of basic service tier is also higher than that of male viewers（Liuo et al., 2001）. Therefore, female viewers would be expected to be less willing to accept the tiering system because they might be afraid that the tiering system would reduce the prevailing number of channels.

People aged 65 or higher are a good target market for cable TV service since they have more leisure time available. However, the impacts of age on the demand for cable TV service are inconsistent in the existing empirical literature. Webb (1983) finds that age is not statistically significant in the cable demand. Rubinovitz(1993) finds that the percentage of the population for viewers between the ages of 25 and 54 is statistically significant in the demand for basic cable service. Tavakoli and Cave (1996) finds that older viewers tend to watch marginally more television than younger viewers. Older viewers may not be willing to accept the tiering system because they are afraid that cable TV firms raise total monthly fee on cable TV through the new system. However, due to the fact that the tiering system is a new and complicated system to cable TV viewers in Taiwan, and older viewers are more mature than younger viewers, older viewers may understand better than younger viewers do. Accordingly, older

viewers may be more willing to accept the tiering system than younger viewers. Therefore, the impact of age on viewers' willingness to accept the tiering system is indeterminate.

Education also can be used to study of viewers' preference and patterns（Rust et al., 1992）. As the payment of the tiering system is more complex than that of the prevailing bundling pricing system, highly-educated viewers will be more capable of distinguishing their differences. Therefore, we expect that viewers with higher education will be more willing to accept the tiering system.

Different social classes have different tastes and viewing patterns（Tavakoli and Cave, 1996）. Therefore, viewers' willingness to accept the tiering system may be different for different social classes. In this paper, viewers will be grouped into two social classes, viewers without a regular job (including housekeeper and student) and viewers with a regular job (including blue color labor, basic administrator, purchaser, social worker, professional/technical worker and company owner/manager), to see whether the factor of social status is an important determinant of viewers' willingness to accept the tiering system.

According to the consumption theory, the demand for normal goods will increase as consumers' incomes increase. However, Pacey（1985）, Mayo and Otsuka（1991）, and Ford and Jackson（1997）find that the basic service of cable television is an essential goods[3]; but Webb（1983）finds that the low-income consumers prefer basic cable, while high income consumers prefer pay cable. As a result, the relationship between viewers' willingness to accept the tiering system and their incomes is hard to determine.

Blackwell et al. (2001) claims that family or household variables affect consumer purchasing. The members of household could have different preference on the demand for television programs. The larger a household's size is, the more variety their preference there will be. In order to satisfy each member's preference,

[3] An essential good is very close to a necessary good. Moreover, the demand for an essential good is almost not affected by changes in income.

the desire for subscribing lots of channels will be increased. Consequently, the prevailing bundling pricing system would be more suitable to a large size household than the tiering system.

Consumption behavior characteristics can be represented by consumers' usage of the purchased products or services. The usage of cable TV consumption is important to cable TV firms in decision-making and strategy-designing. Knowing when, where, how and how much the usage of cable TV occurs is beneficial to segment the market. The research on television viewing consumption is usually described by time of day and by day of the week （Tavakoli and Cave, 1996）. Owing to the fact that heavy viewers of television watch more days per week and more time per day. They will be less willing to accept the tiering system because they will have fewer options in the basic service tier under the tiering system compared with the prevailing bundling pricing system.

Television viewers usually have their favorite channels. The larger number of favorite channels with the variety of programs viewers watch on the TV, the more possible they will prefer the prevailing bundling pricing system. In the contrast, the tiering system will cost much more money when viewers tend to watch channels beyond the basic service tier. Therefore, the number of favorite channels is expected to have a negative impact on viewers' willingness to accept the tiering system.

In the demand theory, monthly fee can affect the demand for cable TV service. According to the tiering system designed by the Government Information Office of Taiwan, all channels will be grouped into two tiers. If the tiering system is to be implemented, the monthly charge of the basic service tier by cable TV firms can't exceed the amount of NT$600 under the price cap. Therefore, if viewers spend higher monthly fee currently, they will prefer the tiering system because it will separate basic rate and pay cable service. Viewers can freely choose their options depending on their preference such that their total monthly expenditures on the cable TV service may

decrease.

According to Webb（1983）, TV viewers living in the mountain states have a higher-than-average demand for cable TV service which may reflect a lack of alternative entertainments. Also, demand for cables is higher wherever the reception quality is poor. As to the distribution of geographic area in Taiwan, there is a considerably high proportion of mountain area. The density of population is relatively high in plain areas. Most people living in urban areas will have more accesses to the innovative service such that they are more willing to accept the tiering system.

Finally, the substitutes of cable TV service can also affect the consumption of cable TV service. Thus, if viewers spend a considerable expenditure on other alternative entertainments, it is possible that the content of current cable service is not completely satisfactory to viewers. If cable TV firms can supply a differential service through the tiering system, the various needs of viewers may be satisfied. Hence, the explanatory variable of viewers' expenditures on other entertainments is expected to have a positive impact on viewers' willingness to accept the tiering system.

Therefore, dependent upon the above theoretical foundation and equation (5), the empirical model of viewers' willingness to accept the tiering system can be established as follows:

$$\underset{(+)}{TIER} = f(\underset{(-)}{SEX}, \underset{(?)}{AGE}, \underset{(+)}{EDU}, \underset{(?)}{CLASS}, \underset{(?)}{Y}, \underset{(-)}{HS}, \underset{(-)}{DAY}, \underset{(-)}{HOUR}, \underset{(-)}{NCVF}, \underset{(+)}{PRICE}, \underset{(+)}{URB}, \underset{(+)}{MEOOE}) \quad (6)$$

where TIER represents a viewer's willingness to accept the tiering system; SEX represents a viewer's gender; AGE represents a viewer's age; EDU represents a viewer's education level; CLASS represents a viewer's social class; Y represents a household's monthly income; HS represents a household's family size; DAY represents the number of days that a viewer watches TV per week; HOUR represents the number of hours that a viewer watches TV per day; NCVF represents the number of channels that a viewer favors; PRICE represents a

household's current monthly fee on cable TV; URB indicates whether a household is located in an urban area or not; MEOOE represents the monthly expenditures on other entertainments spent by a household; and the notation under each independent variable indicates its expected sign.

3. Data Description and Empirical Results

3.1 Data Description

The data utilized in this paper are from the survey data of Taiwan's cable TV viewers, which were surveyed by Central Telecommunication Co. Ltd. through the multistage random digit dialing system between 6:15 p.m. and 10:00 p.m. during the periods of August 20 to August 21 and August 24 to August 30, 2000. The valid sampling viewers had to be cable subscribers and were at least 18 years old. For the sample to be of enough representativeness, the sampling method used in the survey is the disproportionate stratified sampling. Specifically, the survey covers 51 authorized franchised districts in Taiwan. The corresponding proportion for each area is according to the proportion of that area's cable subscribers, based on "The Survey of Family Income and Expenditure" conducted by Directorate-General of Budget, Accounting, and Statistics, Taiwan. Totally, 3309 phone calls were made. Among them, 1195 respondents refused to answer; the remaining 2114 phone calls were effective. The response rate was 63.9%. Under 95% confidence interval level, the sampling error was + /- 2.1%. In addition, definition and description of the relevant variables in this paper are illustrated in Table 1.

The frequency distributions of the relevant variables are summarized in Table 2. Although the number of effective phone calls is 2114, the total frequency for each question may not be the same because some respondents are not willing to answer or do not have a positive answer for some questions. The frequencies of male and female respondents are 1055 and 1059, respectively, which are almost even. About 78 % of respondents are within the range of 18 years to 49 years old. About 76 % of respondents' education levels are

beyond high or vocational school. About 51 % of respondents belong to the large households with at least 5 family members. About 89 % of respondents watch TV every day. About 62 % of respondents watch TV for two to four hours per day. About 94 % of respondents' numbers of favorite channels are below 10, and only about 6 % of respondents favor 10 or more channels. About 64 % of households' current monthly fees on cable TV are higher than 550 NT dollars. About 37 % of respondents' homes are located in the urban area. The descriptive statistics of the relevant variables are listed in Table 3.

3.2 Empirical Results

Three different models of equation (6) are estimated by using the binary logit regression, and their regression results are presented in Table 4. Model 1 is composed of all explanatory variables included in equation (6). Model 2 deletes Y, DAY and URB from Model 1. Model 3 further deletes SEX, HS and MEOOE from Model 2. The variance inflationary factor (VIF) is also used to test the degree of multicollinearity among explanatory variables. The VIF value is equal to 1 for the explanatory variable which is not correlated with others, but the VIF value may be even more than 10 for the explanatory variable highly correlated with others. Snee (1973) conservatively claims that if the largest VIF value of one equation exceeds 5, there will exist a serious multicollinearity problem in the regression of the equation. Since the VIF values of all explanatory variables in Model 1 are below 1.23157, those in Model 2 are below 1.22464 and those in Model 3 are below 1.17036, there is almost no multicollinearity problem in the regression models of equation (6). In addition, only coefficients of CLASS, NCVF and PRICE in Model 1 are significantly different from zero; however, coefficients of AGE, EDU, CLASS, HOUR, NCVF and PRICE in both Model 2 and Model 3 are significantly different from zero. Furthermore, the significance levels of AGE, EDU and CLASS in Model 3 are higher than those in Model 2. Through the Hosmer and Lemeshow goodness-of-fit test, the Chi-Square value

of Model 3 is equal to 6.3516, indicating that Model 3 does fit equation (6) very well. Therefore, the regression results of Model 3 in Table 4 will be chosen for this paper.

The empirical results of Model 3 show that the signs of coefficients of AGE, EDU, CLASS, HOUR, NCVF, PRICE are all as expected, and their estimates are statistically significant at least the 10 % level. The estimated coefficient of AGE is positive and highly significant. The underlying reason for it is that older viewers are more mature and have a clearer picture about the complicated tiering system than younger ones. Therefore, older viewers are more capable of managing their expenditures under the tiering system so that they are more willing to accept the tiering system. The estimated coefficient of EDU is positive and reaches the 1 % significance level. This result confirms the belief that highly-educated viewers are more capable of distinguishing the differences between the prevailing bundling pricing system and the tiering system. As to the estimated coefficient of CLASS, it is significantly negative at the 5 % level, indicating that viewers with a job and regular income are less willing to accept the tiering system than those without a job and regular income. There are two possible reasons for this result. One is that viewers with a job have to work and may not have enough time to clarify the tiering system. Another one is that viewers with a regular income are usually responsible for paying monthly fees on cable TV, and they naturally will be more afraid of increased monthly fees by cable TV firms through the tiering system. The estimated coefficient of HOUR is negative at the 10 % significance level for the reason that compared with the prevailing bundling pricing system heavy viewers are afraid of having fewer options in the basic service tier under the tiering system. The estimated coefficient of NCVF is negative at the 5 % level of significance because viewers with a larger number of favorite channels are afraid that the tiering system will cost them much more money than the prevailing bundling pricing system does. The estimated coefficient of PRICE is positive and highly significant because

viewers who spend higher monthly fee currently can freely choose their options depending on their preferences under the tiering system such that their total monthly expenditures on the cable TV service may be reduced.

In addition, the reason for the estimated coefficient of SEX to be insignificant could be that there is no difference between TV-watching behavior characteristics of male and female respondents in the sample of this paper. Two possible reasons for the estimated coefficient of Y to be insignificant are that the proportion of monthly fee on cable TV in a household's total monthly expenditure is trivial, and cable TV service is an essential good to most households in Taiwan. The reason for the estimated coefficient of HS to be insignificant is that the household size may not be able to reveal all family members' preferences perfectly. The possible reasons for the estimated coefficient of DAY to be insignificant are that about 89 % of respondents watch TV every day, and cable TV service is an essential good to most households in Taiwan. The reason for the estimated coefficient of URB to be insignificant is that Taiwan is a small island with a high population density and the geographic factor does not affect viewers' willingness to accept the tiering system. Finally, the reason for the estimated coefficient of MEOOE to be insignificant is that cable TV service can not be easily substituted by other alternative entertainments as most TV viewers seem to regard watching cable TV as a leisure activity and a means of acquiring information.

4. Conclusion and Suggestion

Since the Cable Television Act was announced in 1993, monthly fees have significantly fluctuated along with ups and downs in the number of cable TV firms in Taiwan. As a result, the prevailing bundling pricing has been challenged. The tiering system to solve the above problem has been suggested by most scholars and government officers. Although all of the cable TV firms welcome the tiering system, cable TV viewers' preference for the system seems to be ambiguous. Therefore, the cable TV viewers' personal characteristics,

TV-watching behavior, knowledge of and willingness to accept the tiering system have to be clarified in order to enhance the feasibility of the system. Since most existing studies on the demand for cable TV service in Taiwan are focused on the univariate analysis, and cable TV viewers' behavior can not be studied comprehensively, this study first attempts to build a theoretical model of cable TV viewers' behavior based on their behavior characteristics and the pricing strategy adopted by cable TV firms in Taiwan. Then, the logit model of cable TV viewers' willingness to accept the tiering system is derived through the assumption of utility maximization and the mathematical manipulation of the theoretical model. By utilizing the survey data of Taiwan's cable TV viewers in 2000, the logit model of viewers' willingness to accept the tiering system is estimated. The empirical results show that there is no difference between female and male viewers in willingness to accept the tiering system perhaps for the reason that there is no difference between TV-watching behavior characteristics of male and female respondents in the sample of this paper . Older viewers and higher-education viewers tend to be more willing to accept the tiering system since they are more mature and have a clearer picture about the complicated tiering system. Viewers with a regular job are less willing to accept the tiering system because they may not have time to clarify the complicated tiering system and are more careful in managing their expenditures. Viewers' willingness to accept the tiering system is independent of households' income levels and sizes for the possible reasons that cable TV service is an essential good to most households in Taiwan, the proportion of monthly fee on cable TV in a household's total monthly expenditure is trivial, and the household size may not be able to reveal all family members' preferences perfectly. Viewers who spend more hours a day on watching cable TV and with more favorite channels are less willing to accept the tiering system because they are afraid that cable TV firms may raise monthly fees through the tiering system. The higher monthly fees viewers pay

currently, the more willing to accept the tiering system they are. The geographic factor and the availability of substitutes of cable TV service do not affect viewers' willingness to accept the tiering system for the reasons that Taiwan is a small island with a high population density and cable TV service can not be easily substituted by other alternative entertainments.

The empirical results in this paper yield three possible policy implications. First, Government Information Office should make more efforts on the public promotion, especially, toward younger, less educated people or viewers with a regular job to enhance the feasibility of the tiering system since they have not yet had a clear picture about the real contents of the tiering system. Secondly, the number of tiers available to cable TV viewers should be as many as possible to increase their welfare if the government wants to take the line of least resistance to the tiering system. Thirdly, the price cap should be maintained at least in the short run to prevent the cable TV firms from raising monthly fees through the tiering system.

Acknowledgements

The authors are grateful to the National Science Council for financial support under NSC 91-2416-H-004-037; conference participants particularly chairman Jack W. Hou and discussant Mita Bhattacharya, at the 78th Annual Conference of Western Economic Association International, for useful comments and suggestions. All remaining errors are the authors'.

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Table 1: Definition and Description of the Relevant Variables

Variables	Definition	Description
TIER	Willingness to accept the tiering system	If respondents prefer the prevailing bundling pricing system, then TIER=0; if respondents prefer the tiering system, then TIER=1.
SEX	Gender	If respondents are male, then SEX=0; if respondents are female, then SEX=1.
AGE	Age	Respondents are grouped into five categories according to their ages as follows: 18-29, 30-39, 40-49, 50-59, and 60+, which are denoted from 1 to 5 respectively.
EDU	Education	Respondents are grouped into six categories according to their education levels as follows: primary, junior high, high/vocational, junior college, college, and graduate school, which are denoted from 1 to 6, respectively.
CLASS	Social status	If a respondent does not have a regular job, then CLASS=0; if a respondent does have a regular job, then CLASS=1.
Y	A household's Monthly income	Households' monthly incomes are grouped into nine Categories as follows: below NT$20000, 20000-39999, 40000-59999, 60000-69999, 80000-99999, 100000-119999, 120000-139999, 140000-159999, and 1600000+, which are denoted from 1 to 9, respectively.
HS	Household size	Households are grouped into seven categories according to their sizes and are denoted from 1 to 7, respectively.
DAY	The number of days that a respondent watches TV per week	
HOUR	The number of hours that a respondent watches TV per day	

NCVF	The number of a respondent's favorite channels	If the number of favorite channels by a respondent is greater than or equal to 10, then NCVF=1; otherwise, NCVF= 0.
PRICE	A household's current monthly fee on cable TV	Households' current monthly fees are grouped into nine categories as follows: no charge, below NT$300, 301-350, 351-400, 401-450, 451-500, 501-550, 551-600 and 601+, which are denoted from 0 to 8, respectively.
URB	A household's location	If a household is located in an urban area, then URB=1; otherwise, URB=0.
MEOOE	Monthly expenditures on other entertainments by a household	Households' monthly expenditures on other entertainments are grouped into eight categories as follows: belowNT$200, 201-400, 401-600, 601-800, 801-1000, 1000-1500, 1501-2000 and 2000+, which are denoted from 1 to 8, respectively.

Notes: 1 US dollar was equivalent to 31.23 NT dollars in 2000.

Table 2: The Frequency Distribution of the Relevant Variables

Variables	Code	Frequency	Percent Frequency
TIER	0	1061	60.66
	1	688	39.34
SEX	0	1055	49.91
	1	1059	50.09
AGE	1	567	27.21
	2	573	27.50
	3	488	23.42
	4	281	13.48
	5	175	8.40
EDU	1	250	12.04
	2	246	11.85
	3	788	37.96
	4	406	19.56
	5	330	15.90
	6	56	2.70
CLASS	0	1433	67.79
	1	681	32.21
Y	1	78	5.63
	2	193	13.94
	3	323	23.32
	4	214	15.45
	5	138	9.96
	6	179	12.92
	7	69	4.98
	8	57	4.12
	9	134	9.68
HS	1	50	2.41
	2	185	8.92
	3	270	13.01
	4	322	25.16
	5	452	21.78
	6	290	13.98
	7	306	14.78
DAY	1	14	0.71

	2	51	2.58
	3	53	2.68
	4	43	2.17
	5	46	2.32
	6	10	0.51
	7	1763	89.04

Table 2: The Frequency Distribution of the Relevant Variables (continued)

Variables	Code	Frequency	Percent Frequency
NCVF	0	1747	93.82
	1	115	6.18
PRICE	0	12	0.76
	1	79	4.18
	2	18	1.13
	3	24	1.51
	4	58	3.66
	5	244	15.38
	6	140	8.83
	7	905	57.06
	8	106	6.68
URB	0	1334	63.10
	1	780	36.90
MEOOE	1	331	19.95
	2	204	12.30
	3	283	17.06
	4	62	3.74
	5	293	17.66
	6	137	8.26
	7	148	8.92
	8	201	12.12

Table 3: Descriptive Statistics of the Relevant Variables

Variables	Mean	Standard Deviation	Minimum Value	Maximum Value
TIER	0.3934	0.4886	0	1
SEX	0.5000	0.5000	0	1
AGE	2.4837	1.2522	1	5
EDU	3.2351	1.2728	1	6
CLASS	0.3221	0.4674	0	1
Y	4.4751	2.2842	1	9
HS	4.5590	1.5799	1	7
DAY	6.6050	1.2103	1	7
HOUR	3.7861	1.9636	1	8
NCVF	0.054	0.2269	0	1
PRICE	6.0920	1.7225	0	8
URB	0.3690	0.4826	0	1
MEOOE	4.0789	2.3882	1	8

Table 4: Regression Results of Equation (6)

Variables	Model（1）	Model（2）	Model(3）
Intercept	-1.8269*** (0.6954)	-1.9920*** (0.5084)	-1.9731*** (0.4021)
SEX	-0.1026 (0.1601)	-0.2022 (0.1374)	—
AGE	0.1153 (0.0728)	0.1235** (0.0618)	0.1833*** (0.0557)
EDU	0.0599 (0.0763)	0.1056* (0.0627)	0.1448*** (0.0554)
CLASS	-0.5149*** (0.1983)	-0.2701* (0.1601)	-0.2866** (0.1417)
Y	-0.00228 (0.0387)	—	—
HS	0.0678 (0.0522)	0.0567 (0.0441)	—
DAY	0.00718 (0.0639)	—	—
HOUR	-0.0513 (0.0447)	-0.0710* (0.0368)	-0.063* (0.0338)
NCVF	-0.7101** (0.3544)	-0.6985** (0.3127)	-0.6223** (0.2798)
PRICE	0.2017*** (0.0494)	0.2154*** (0.0432)	0.1791*** (0.0384)
URB	0.0856 (0.1639)	—	—
MEOOE	-0.0191 (0.0346)	-0.0116 (0.0292)	—
Effective Sample Size	738	982	1141
Likelihood Ratio	39.4212***	54.8196***	54.5045***

Degree of Freedom	12	9	6
Goodness-of-fit Statistics	6.8358	5.7061	6.3516

Notes: The figure in parenthesis is standard error. ***, ** and * represent that the coefficients are significantly different from zero at the 0.01, 0.05 and 0.10 levels, respectively. Goodness-of- fit statistics are from Hosmer and Lemeshow goodness-of-fit test.