

This article was downloaded by: [National Chengchi University]

On: 03 March 2014, At: 19:29

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Journal of Media Economics

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/hmec20>

Assessing the Economic Value of Public Service Broadcasting in Taiwan Using the Contingent Valuation Approach

Yih-Ming Lin ^a, Tsu-Tan Fu ^b, Powen Yeh ^c & Mei-Ying Huang ^d

^a Department of Applied Economics, National Chiayi University, Chiayi, Taiwan

^b Department of Economics, Soochow University, Taipei, Taiwan

^c Department of Finance, Chien Hsing University, Zhongli, Taiwan

^d Department of Economics, National Taipei University, Taipei, Taiwan

Published online: 26 Nov 2013.

To cite this article: Yih-Ming Lin, Tsu-Tan Fu, Powen Yeh & Mei-Ying Huang (2013) Assessing the Economic Value of Public Service Broadcasting in Taiwan Using the Contingent Valuation Approach, *Journal of Media Economics*, 26:4, 186-202, DOI: [10.1080/08997764.2013.842921](https://doi.org/10.1080/08997764.2013.842921)

To link to this article: <http://dx.doi.org/10.1080/08997764.2013.842921>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms &

Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

Assessing the Economic Value of Public Service Broadcasting in Taiwan Using the Contingent Valuation Approach

Yih-Ming Lin

Department of Applied Economics, National Chiayi University, Chiayi, Taiwan

Tsu-Tan Fu

Department of Economics, Soochow University, Taipei, Taiwan

Powen Yeh

Department of Finance, Chien Hsing University, Zhongli, Taiwan

Mei-Ying Huang

Department of Economics, National Taipei University, Taipei, Taiwan

The objective of the study is to provide empirical evidence on the value of public service broadcasting (PSB) in Taiwan, which is a critical factor when considering the provision of more public funding. Being based on a nationwide telephone survey in Taiwan, this study uses the contingent valuation method to elicit citizens' willingness to pay (WTP) for maintaining the current PSB in Taiwan. The results show that household average WTP per year for PSB is estimated to be NT\$982 (US\$29.89), which is equal to 0.18% of GDP per capita in 2007. Such WTP estimate is much higher than the current government subsidy for PSB per household, which implies respondents' high appreciation on PSB as well as the potential benefit that Taiwan PSB could bring to the family.

Yih-Ming Lin is an Associate Professor of Applied Economics at National Chiayi University, Taiwan. His current research focuses on efficiency and productivity, cost benefit analysis and happiness study.

Tsu-Tan Fu is a Professor of Economics at Soochow University, Taiwan. His research interests include non-market goods evaluation and industrial efficiency analysis.

Powen Yeh is an Associate Professor of Finance at Chien Hsin University of Science and Technology, Taiwan. Her current research interests are in the areas of consumer behavior and decision making, applications of contingent valuation method, health economics and behavioral finance.

Mei-Ying Huang is a Professor of Economics at National Taipei University, Taiwan. Her current research focuses on industrial economics and antitrust policy analysis.

Address correspondence to Tsu-Tan Fu, Department of Economics, Soochow University, Taipei, 100, Taiwan. E-mail: tfu@scu.edu.tw

Our estimates of WTP provide important information for government authorities and policy-makers when making funding decisions. Furthermore, our survey results also point to some prioritized functions as potential niches on which the Taiwan PSB could focus in the future.

The purpose of this article is to estimate the benefits of public service broadcasting (PSB) in Taiwan using the contingent valuation approach and to investigate the factors affecting the willingness to pay (WTP) for the PSB. The principal objective of PSB in Taiwan is to establish a public service mass media system and to balance out the inadequacy of commercial television. Unfortunately, PSB in Taiwan is confronted by a lack of substantial and stable private funding that is essential for its independent operation without any intervention by commercial and political forces. Unlike in the United States, where most of the PSB revenues come from private membership, private donations, and grants, PSB in Taiwan relies primarily on government sources of funding for its annual operations. According to the Public Television Act and annual reports of the Public Television Service (PTS) Foundation, the Taiwan government has to budget for NT\$900 million¹ (about US\$27.4 million) in donations annually for the PTS's annual operations, which accounts for about 70 percent of its annual revenues. Private donations from enterprises or individuals account for less than 10% of the PTS's annual revenues. The other revenues are interest revenues, rent revenues, and sales revenues, which are generated by PTS business activities.

In this case study, we would like to evaluate the economic benefits of PSB in Taiwan to provide some evidence for policymakers as to what is a reasonable level of funding for PSB on an annual basis. Currently, budgeting NT\$900 million for the PTS is calculated based on the hypothesis of "spending NT\$150 per household on PSB annually." However, the PTS has constantly been in deficit over the long term since it was founded. Therefore, we would like to ask why NT\$900 million should be chosen. Is the amount of the current appropriation insufficient to support a good quality of PSB in Taiwan? In addition, why does the government not invest much more public funding in the PSB? There has never been an agreement reached about how much a reasonable level of public funding should be, or what should be the appropriate funding mechanism. The extent to which the government should budget for PSB every year or, put slightly differently, how much public funding should be invested in PSB remains a significantly controversial issue in media policy. Without robust evidence regarding the value of PSB, the debate on funding remains a "political issue" (O'Hagan & Jennings, 2003). The main objective of this study is to provide empirical evidence on the value of PSB in Taiwan, to provide government authorities and policymakers with important information when making funding decisions.

This study, based on a nationwide telephone survey in Taiwan, uses the contingent valuation method (CVM) to elicit citizens' WTP to maintain the current level of PSB in Taiwan. The CVM is a well-established research approach that uses survey techniques to elicit respondents' valuations of nonmarket goods (Haab & McConnell, 2002; Hanemann, 1984). In particular, the CVM has been widely used to evaluate the benefits of public goods based on the concept of WTP because they are consistent with the principles of welfare economic theory and cost-benefit analysis. Recently, the CVM has been increasingly applied to not only the value of PSB but also cultural public goods and resources (Chyi, 2005; Noonan, 2003; Papandrea,

¹The average exchange rate in 2007 was about US\$1 = NT\$32.85.

1999; Throsby, 2003; Santagata & Signorello, 2000). Conceptually, the WTP can be regarded as the economic benefit of services provided by the PSB in Taiwan.

Past studies that value the PSB using the contingent valuation method are limited. Schwer and Daneshvary (1995) is the first seminar paper to estimate the WTP for a local PSB station in Las Vegas, using an open-ended CVM. The survey data were collected by telephone interview as well as by mail survey. The average respondent's WTP to keep PBS in Las Vegas was estimated to range from \$41.56 to \$33.44 annually. Finn, McFadyen, and Hoskins (2003) and Finn, McFadyen, Hoskins, and Hupfer (2001) estimated the value of the CBC in Canada using the choice experiment approach and found that there exist both the use and nonuse value of services provided by the CBC. Furthermore, studies on the RTÉ of Ireland (Delaney & O'Toole, 2004, 2006a, 2006b), the British Broadcasting Corporation (BBC) of the UK (BBC, 2004), and NHK of Japan (Tsuji, 2007; Tsuji & Miyahara, 2007) have, through the application of the CVM, been shown to determine the value of PSB in each country studied. Among them, Delaney and O'Toole (2006b) estimated the individual WTP as well as the household WTP, respectively, using different survey designs in their questionnaires. It is surprising that there is no statistically significant difference between the two estimated WTP means. Delaney and O'Toole (2006b) concluded that the WTP for PSB should be referred to as *household WTP* and not as individual WTP.

The purpose of this article is to provide empirical evidence on the value of PSB in Taiwan, which is a critical piece of evidence if public support is to be enlisted. Following Delaney and O'Toole (2006b), the estimated WTP can be regarded as the household WTP for PSB. The subjects of this telephone survey are those adults aged 20 or more who are responsible for the household budget allocation. We believe that this research design should be more representative of household opinion. Another feature of this study is that a function variable and several attitude variables are incorporated into this model besides the demographic and usage variables. The function variable is introduced and investigated in Tsuji (2007). To capture respondents' expectations regarding the public functions that they expect PSB to fulfill, six functions of PSB are listed in the questionnaire and respondents are asked to express their expectations concerning and satisfaction with the functions. In this study, we aggregate the expectations for six different functions to form an index. In addition, three attitude variables are also included in the empirical model specification.

However, there are some concerns regarding the possibility that there could exist an over-estimation problem such as a strategic or hypothetical bias which is known as the difference between estimated WTP and real WTP (Blumenschein, Blomquist, Johannesson, Horn, & Freeman, 2008; Blumenschein, Johannesson, Yokoyama, & Freeman, 2001; Throsby & Withers, 1986). The reliability of the estimated WTP is difficult to verify and validate (Johannesson, Jönsson, & Borgquist, 1991) since there is no "real" WTP value to be compared. Furthermore, it should be noted that an expressed intention of WTP does not suffice as evidence that a certain price will manifest itself in the market. Similarly, Phillips et al. (1997) also indicated that the starting price could significantly influence the estimated WTP. To minimize the starting point bias, they suggested that the starting offered price be assigned randomly among the respondents, which is the procedure followed in this study.

The remainder of this article is organized as follows. Section 2 introduces the sampling method adopted in the survey and describes the contents of the questionnaire used in this study. In Section 3, a simple utility difference model which uses a Probit model to investigate the

determinants of WTP for the value of PSB is proposed. The definitions and descriptive statistics of the variables used in the empirical model specifications are also presented. Furthermore, we provide by way of illustration parametric estimates of empirical WTP values for the PSB as well as two nonparametric estimates of the WTP. Finally, Section 4 presents the concluding remarks.

THE SURVEY AND RESEARCH DESIGN

The Survey

The survey was conducted by the Center for Survey Research at Academia Sinica² during December 21–28, 2007. This telephone survey was based on random digit sampling using the computer-assisted telephone interviewing (CATI) system, which is designed to be representative of adult residents in Taiwan. Surveys were delivered to adults aged 20 years or older with responsibility for their household budget allocation who were randomly selected as proper subjects for this telephone survey. A two-stage stratified systematic sampling approach was used. In the first stage, the number of observations in each municipality was determined by the probability proportional to size sampling method. In the second stage, using the CATI system, the survey was conducted on a random basis and the respondents were randomly selected adults 20 years of age or older within each municipality. Household residents in each municipality were systematically selected. The main theme of this survey was related to the issues of PSB and answers to questions on household and individual characteristics were also collected. The response rate of this survey was 22.37%. However, we could not conduct a representative test for our sample respondents because our subjects were household adults who were responsible for budget allocation in the household. There was no prior information on the gender or age of these adults. Thus, we could not identify the underlying population of this kind of subject. As a result, we were unable to examine the differences in the distribution between respondents and nonrespondents.³

Before the telephone survey was actually conducted, a focus group was held and a pilot survey was conducted. These procedures, as suggested by Papandrea (1999), are used not only to determine the reasonable prices and to ensure the validity of the questionnaire, but also to

²The Center for Survey Research provides a variety of services to facilitate educational and experiential opportunities in an effort to share experiences and assist researchers in all aspects of survey operation.

³One of the reviewers has pointed out the potential nonresponse bias in this survey. To check such potential bias, we have checked the detailed report on every selected telephone number and calculated the response rate based on the definitions of the American Association for Public Opinion Research (AAPOR, 2011). We find that most of the nonrespondents refused or were not able to participate before the purpose of this study was identified, and before being asked any questions in the survey. These nonrespondents who could not be contacted or refused before the purpose of the study was identified could be assumed to have values based on results for those observed. Only 1.52% of the total selected sampled respondents participated in the survey and may have been asked questions related to their “willingness to pay for PSB” before deciding to quit half way through the survey. Therefore, our nonresponse bias seems to be relatively insignificant. In addition, the response rate that we used in the survey is defined as the number of “complete interviews” divided by “the number of interviewees” plus “the number of eligible but non-interviewees” plus “all cases of unknown eligibility.” Using this definition, the response rate of our survey is 22.37%. However, an alternative definition of the response rate can yield a higher response rate. That is, by excluding cases of unknown eligibility from the denominator, the resulting response rate becomes 35.41% in our survey. We thank this reviewer’s suggestion to provide the above discussion to explain possible potential bias in this survey.

reduce the potential for strategic bias in previous seminal work (Throsby & Withers, 1986). Besides, the offered prices are assigned randomly among the respondents to minimize the bias introduced by the starting bid in this study. A total of 389 subjects completed the telephone interview during the survey period. A sample of 376 observations with complete information was used for the analysis of the WTP for PSB.

To elicit the willingness to pay for PSB, the dichotomous choice format of elicitation is used in the questionnaire and respondents are asked to express whether they are willing to pay a certain amount of money regarding the hypothetical scenario presented to the respondents. The scenario is designed as follows:

The PTS is now funded by the government to produce the educational, cultural, aesthetic, and news programs for people of all ages without reliance on advertising revenues. Imagine that the government will not provide annual funding anymore and that the PTS must charge the public to maintain its current service. However, the amount of money that you spend may also reduce your disposable income.

Considering the benefits that the PTS brought to your household, are you willing to pay AAA NTD every year to maintain the operation of the PTS?

Here, a possible range of values for the maximum WTP is set according to the focus group conducted in advance. There are six offered prices used in the questionnaire ranging from NT\$200 to NT\$3,000 (see Table 1). These initial prices are randomly assigned to each respondent. The sample used for the empirical study consists of 376 subjects. The responses to those randomly assigned bidding prices are illustrated in Table 1. In each bid price subsample, there are more than 60 observations. Obviously, the percentage of yes responses decreases with the increase in the bidding price, in accordance with the demand theory that an increase in the price of a good may lead to a decrease in the quantity demanded of that good. The mean yes percentage is about 44% and yes percentages range from 62.5% to 22.2%.

Contents of the Questionnaire

There are mainly four parts of questions contained in the questionnaire after the introductory remarks, including social demographic variables, usage variables, functional variables, and

TABLE 1
The Distribution of Dichotomous Responses for the Initial Bid Price

<i>Bid Prices (NT\$)</i>	<i>Observations</i>	<i>Number of Yes (%)</i>
\$200	64	40 (62.50%)
\$500	62	34 (54.84%)
\$800	60	27 (45.00%)
\$1,200	64	29 (45.31%)
\$2,000	63	21 (33.33%)
\$3,000	63	14 (22.22%)
Total	376	165 (43.88%)

attitudinal variables. Socioeconomic variables refer to the respondents' age, gender, and level of education. Data profiles are summarized in Table 2. In terms of the whole sample of 376 respondents, there are slightly more women (GENDER), who are aged 46 on average (AGE). Almost half of the subjects are educated beyond senior high school.⁴

Using variables such as the usage of media implies the demand for it. As a result, the respondents' usage of media and usage of PTS are both investigated. The former includes access to cable service, while the latter includes the average number of hours spent watching PTS each week. As to the media usage patterns of the respondents, Table 2 also shows that the percentage of households equipped with cable is close to 85% (CABLE, access to cable service), which almost equals the cable penetration rate revealed by AC Nielsen (CASBAA, 2008). Most of the respondents watched PTS less than an hour per week (PTSWATCH, average hours of watching PTS). This reflects the fact that the viewing share of PTS remains low in Taiwan, especially when compared to the average hours of daily TV watching.

Expectations of and satisfaction with the main functions of PSB are for capturing the respondents' expectations toward the public functions that they expect PSB to fulfill. Six functions of PSB are listed in the questionnaire and respondents are asked to express their expectations of and satisfaction with the functions.⁵ The results are provided in Table 3 and Figure 1. Among those six functions, respondents place strong emphasis on the educational function and cultural function (Functions 3 and 5), whereas the least important function is to provide entertaining programs (Function 4). Although Functions 3 and 5 were regarded as "very important" by over 58% of respondents, more than 40% of subjects also regarded the other three functions (Functions 1, 2, and 6) as "very important." In fact, on average over 81% of the respondents regarded at least one of the six functions as being important. Even Function 4 was also regarded as being important by 59% of the subjects. Furthermore, it was found that, among these six functions provided by the commercial TV, Functions 1 and 3 were functions with a high degree of dissatisfaction, with Function 4 being the one with the highest percentage

⁴One of the reviewers has pointed out that the under-representation of the 20–29 and over 60 age groups in our sample may have contributed to inflated WTP estimates. There may be two reasons for such a possibility of under-representation, the first reason being related to the telephone coverage rate of the telephone survey. Because the telephone survey was usually conducted in the evening (18:00–21:30) in Taiwan, young people aged 20–29 may not have been home yet and would have been less likely not to have received a call (via a residential phone) than those in the other age groups. The second reason is that our target interviewees in this project are the decision makers in the household. In Taiwan, the average ages of getting married have been about 31.8 and 29.4 years old for men and women, respectively, in recent years. Thus, the proportion of those in the 20–29 age group being married is relatively low (less than 15%). Unmarried young men and women in Taiwan, who often live with their parents, are not regarded as household decision makers in the family, even though they may already have a job. Moreover, those over the age of 60 in Taiwan have often retired or are out of the job market and many of them live with married sons. In this case, many of them are not considered to be household decision makers. Therefore, by our research design (i.e., the survey target interviewees are the household budget allocation decision makers in the family), the under-representation of these two age groups may be reasonable. The problem of possible under-representation on inflated WTP estimates thus may be not serious in this survey.

⁵The six functions presented in the questionnaire are adapted from Tsuji (2007), and are also well-recognized by participants in the focus group. They consist of (a) provide unbiased plural opinions on social and political issues (Function 1); (b) provide immediate and correct information on public-related issues (Function 2); (c) provide educational programs to people of all ages (Function 3); (d) provide programs that are entertaining (Function 4); (e) pass down the Taiwanese traditional arts and culture to the next generation (Function 5); and (f) provide programs that are not influenced by advertising and sponsors (Function 6).

TABLE 2
Descriptive Statistics of Respondents' Socioeconomic Characteristics

<i>Characteristic</i>	<i>Frequency</i>	<i>%</i>
Age ($M = 45.91$)		
20–29	25	6.65
30–39	94	25.00
40–49	129	34.31
50–59	88	23.40
60–69	24	6.38
70–79	16	4.26
Average hours of watching PTS		
0 h	128	34.04
Less than 0.5 h	70	18.62
0.5–1 h	56	14.89
1–3 h	79	20.01
3–5 h	18	4.79
More than 5 h	25	6.65
Gender		
Male	182	48.40
Female	194	51.60
Education		
Illiteracy	5	1.33
No formal edu.	8	2.13
Elementary	25	6.65
Junior high	33	8.78
Senior high	121	32.18
Junior college	73	19.41
Undergraduate	89	23.67
Graduate degree	22	5.85
Access to cable service		
Yes	311	84.9
No	65	15.1

Note. Total observations = 376.

of satisfaction. Therefore, in general, respondents consider that the commercial TV stations have succeeded in providing “entertaining” service but have failed to provide “unbiased and plural opinions” or “educational programs.” The gap between the respondents’ expectations and satisfaction regarding each function can be observed by comparing the differences between the two. As Figure 1 shows, most functions are far from providing satisfaction compared with the expectations that the respondents put on them. Function 4 is the only exception, indicating that for most respondents “providing programs that are entertaining” is the best function performed by commercial TV stations, although this is the least important thing that they expect PSB to do. Figure 1 also indicates that Function 1 is the function with the largest difference between expectations and satisfaction. This is followed by Functions 3, 5, and 2. Therefore, “provide unbiased plural opinions on social and political issues,” “provide educational programs to people of all ages,” and “pass down the Taiwanese traditional arts and culture to the next generation” are prioritized functions for PSB to emphasize in the future.

TABLE 3
Frequency Distribution of the Expectations of PSB and Satisfaction with Commercial Broadcasting

	Expectations of the Functions Provided by PSB (%)						Satisfaction With the Functions Fulfilled by Commercial TV (%)						
	VI	I	UI	VUI	Neutral	DK	SS	S	DS	SDS	Neutral	DK	
<i>The Six Public Functions of PSB</i>													
Provide unbiased plural opinions on social and political issues (Func 1)	44.41	31.12	10.64	3.46	2.13	8.25	2.39	18.62	37.50	29.79	2.39	9.31	
Provide immediate and correct information on public-related issues (Func 2)	49.73	40.43	4.52	0.80	0.80	3.75	4.79	47.34	29.52	9.04	1.06	8.24	
Provide educational programs to people of all ages (Func 3)	58.51	35.64	1.86	0.27	0.80	2.93	5.05	37.23	33.78	10.64	3.19	10.11	
Provide programs that are entertaining (Func 4)	18.35	40.43	31.65	5.32	1.33	2.93	5.05	57.18	21.28	7.18	2.13	7.18	
Pass down the Taiwanese traditional arts and culture to the next generation (Func 5)	62.23	30.59	3.99	0.53	1.33	1.33	10.64	43.62	29.52	9.57	1.06	5.59	
Provide programs that are not influenced by advertising and sponsors (Func 6)	43.88	38.83	9.84	1.06	1.33	5.05	6.38	50.00	25.00	6.65	5.32	6.65	

Note. PSB = public service broadcasting; VI = very important; I = important; UI = unimportant; VUI = very unimportant; DK = don't know; SS = strongly satisfied; S = satisfied; DS = dissatisfied; SDS = strongly dissatisfied; DK = don't know.

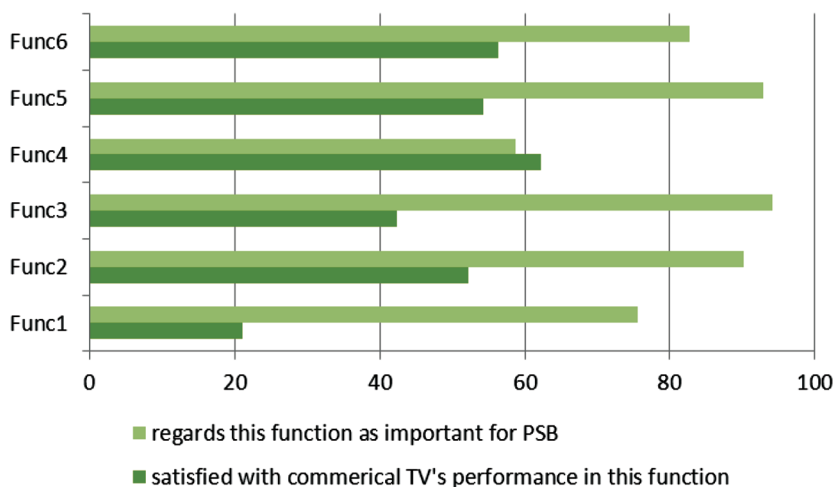


FIGURE 1 The differences between expectations and satisfaction. PSB = public service broadcasting.

THE WTP ESTIMATION RESULTS

Definitions of Variables

The variables used in the empirical Probit estimation include the respondents' dichotomous responses to bidding prices (D as the dependent variable), and independent variables such as the offered bidding price, socioeconomic variables, usage variables, functional variables, and attitudinal variables. Their definitions and descriptive statistics are illustrated in Table 4. Please note that the index for the six functions (FUNC6D) is the aggregated score for the differences between expectations and satisfaction among the six functions in Figure 1.

We have also taken the respondents' opinions toward funding issues into account based on the attitudinal variables. There are three attitudinal questions included in the questionnaire. First, a question regarding the respondents' overall satisfaction toward PTS as a whole is asked. Other attitude-related variables are investigated by asking whether they agree with the statements that "commercial broadcasters will fill any gaps left, if the PTS is closed," and "PTS should be privatized and be entirely self supporting." Answers to these questions can also be viewed as an indication of the respondents' opinions regarding public broadcasting funding issues. In general, most respondents maintain a positive attitude toward the PTS (SATISFY) and do not think that commercial TV stations can fill the gaps caused by the closure of the PTS (REPLACE). Similarly, few people in Taiwan think that the PTS should be commercialized (COMMERCIALIZE).

Empirical Model Specifications

There are two different model specifications estimated in this empirical study. Model I is derived from a utility difference model that is based on a random utility framework following

TABLE 4
Definitions of Variables and Sample Characteristics

<i>Variables</i>	<i>Definitions of Variables</i>	<i>M</i>	<i>SD</i>
Dependent variable			
D	Respondents' binary response to the bid price (1 if yes; 0 if no)	0.44	0.50
Independent variable			
PRICE	The bid price that respondents face	1,286.17	960.04
Socio-economic variables			
GENDER	Gender (male = 1; female = 0)	0.48	0.50
AGE	Age (year-old)	45.91	11.54
EDU	Education (junior college or higher = 1, otherwise = 0)	0.49	0.50
INCOME ^a	Monthly household income (NT\$1,000)	71.68	57.74
Usage variables			
CABLE	Access to cable service (yes = 1; no = 0)	0.83	0.38
PTSWATCH	The average hours spent watching PTS per week last month (h)	1.27	1.96
Function variable			
FUNC6D	Aggregated score for the differences between expectations and satisfaction	2.06	2.00
Attitudinal variables			
SATISFY	Satisfaction with the PTS as a whole (very satisfied/satisfied = 1; otherwise = 0)	0.70	0.46
REPLACE	Think commercial TV can fill the gap left if PTS were to close (strongly agree/agree = 1; otherwise = 0)	0.34	0.48
COMMERCIALIZE	Think PTS should be commercialized (strongly agree/agree = 1; otherwise = 0)	0.40	0.49

Note. PTS = Public Television Service.

^aSince there exist missing values of INCOME, the number of observations for INCOME is 345.

Hanemann's welfare evaluation model (Hanemann, 1984) and is specified as

$$D = \beta_1 + \beta_2 Y - \beta_3 T + \beta_4 S + \varepsilon, \quad (1)$$

where D is the binary choice variable to the bid price (1 if yes; 0 if no), S is the vector of social demographical and individual characteristic variables except for income; Y is individual income, and T is the offered price variable. The Probit model is used in this study. There are two model specifications: Model I and Model II. In Model I, the offered bidding price, socioeconomic variables, usage variables, functional variables, and attitudinal variables are included. The estimation results are shown in Table 5. However, since the coefficient of INCOME is positive but not statistically significant in Table 5, it indicates that the marginal utility of income is the same in the two different response situations. The insignificance of the income variable, which is common in WTP estimation (Schwer & Daneshvary, 1995; Delaney & O'Toole, 2004, 2006a; Chyi, 2005), can be attributed to the small difference in the change in income for a respondent before and after the choice decision.

TABLE 5
Probit Regression Results

<i>Variables/Model</i>	<i>I</i>	<i>II</i>
Socioeconomic variables		
GENDER	-0.1347 (0.1459)	-0.0828 (0.1391)
AGE	-0.0044 (0.0069)	-0.0021 (0.0065)
EDU	-0.1481 (0.1660)	-0.0225 (0.1502)
INCOME	0.0018 (0.0014)	
Usage variables		
CABLE	-0.3151 (0.1930)	-0.3318* (0.1850)
PTSWATCH	0.0427 (0.0389)	0.0639* (0.0377)
Function variable		
FUNC6D	0.1404*** (0.0391)	0.1296*** (0.0371)
Attitudinal variables		
SATISFY	0.4025** (0.1686)	0.4351*** (0.1599)
REPLACE	-0.4234*** (0.1635)	-0.2819* (0.1567)
COMMERCIALIZE	0.1076 (0.1571)	0.1283 (0.1510)
Offered price		
PRICE	-0.0004*** (0.0001)	-0.0004*** (0.0001)
CONSTANT	0.3399 (0.4475)	0.1534 (0.4193)
SAMPLE SIZE	345	376

Note. The numbers in parentheses are the standard errors of the estimates. ***, **, and * denote significance at the 1%, 5%, and 10% confidence levels, respectively.

In Hanemann (1984) and Bowker and Stoll (1988), the marginal utility of income is assumed to be indifferent in the two different response situations. Thus, Equation (1) can be rewritten as

$$D = \beta_1 - \beta_3 T + \beta_4 S + \varepsilon. \quad (2)$$

Model II is Model I without the INCOME term, which is the case if the marginal utility of income remains unchanged in the two different decision situations ($j = 0$ or $j = 1$). Because there exist missing values of INCOME, the number of observations for INCOME is 345. The sample with 376 observations is used for the empirical estimation of Model II, whereas there are only 345 observations used for empirical Model I. Table 5 presents the maximum likelihood

estimation results of the Probit model for two different model specifications to analyze the determinants of the WTP for the PSB. Table 5 shows that the coefficient of INCOME is positive but not statistically significant. Therefore, we use Model II as the empirical model to calculate the WTP for the PSB.

In Table 5, it is shown that the respondent's decision is negatively correlated with the prices offered (PRICE), as expected. The effect of price on the respondent's decision is negative and highly significant at the 1% significance level in all three empirical specification models, in which the signs of the coefficients related to price are consistent with the theoretical predictions. However, the influences of socioeconomic variables are relatively small and none of the variables reaches statistical significance.

Two usage variables (PTSWATCH, CABLE) have the expected signs and are statistically significant in Model I. The negative sign of the coefficient for CABLE means that those who have cable service in the household tend not to be willing to pay for PSB. It is quite reasonable for cable service to compete with PSB and reduce the demand for public service since cable service provides many more TV channels. The same result can be found in Delaney and O'Toole (2004) where those with access to cable or satellite service are significantly more likely to give a zero-bid. The coefficient for PTSWATCH is significantly positive, indicating that watching more hours of PTS is a signal of high demand and will increase the probability of paying for PSB.

The sign of FUNC6D is positive and significant as expected, implying that the larger the gap that an individual finds between his expectation toward PSB and his satisfaction with commercial broadcasters, the higher the probability that the individual might pay for the charge. Finally, SATISFY is significant and positive, while REPLACE is negative and significant as expected. The positive sign of SATISFY means that respondents who are more satisfied with the current performance of the PTS are more likely to pay, whereas the negative sign of REPLACE suggests that those who do not think the PTS can be substituted or replaced are more willing to pay.

Note that, in our survey, the subjects are household adults (heads) who are responsible for their respective households' budget allocation. Their WTP for the PTS actually reflects the WTP of a household (or a family) and not individual WTP. Therefore, although about 70% of them watch the PTS for 1 h or less a week, such a low percentage of them watching the PTS can not imply that they do not know the PTS well. The PTS programs may be watched mostly by their other family members, especially their children. Such a conjecture seems reasonable, because Table 4 shows that 70% of respondents are satisfied with the PTS, only 34% of them think that commercial TV could fill the gap that would be left if the PTS were to close, and 40% of respondents think that the PTS should be commercialized. Therefore, we believe that most respondents clearly recognize the value of the PTS (to their family members), despite their not being frequent PTS watchers.

Value Estimation

The individual's WTP for the maintenance of PSB can be further computed by using equation (2). Using the Probit parameter estimates in Table 5, we can obtain the respondent's predicted WTP. An individual's WTP for PSB is calculated for the sample with 376 observations. As shown in Table 6, the sample average WTP for PSB is estimated to be NT\$982 with a standard

TABLE 6
Estimated Annual Willingness to Pay for Public Service Broadcasting

Willingness to Pay	NT\$ ^a
<i>M</i> (<i>SD</i>)	982.13 (900.79)
Percentile	
25th	86.92
Median	832.71
75th	1,607.64
90th	2,249.04

^aThe average exchange rate in 2007 was US\$1 = NT\$32.85.

deviation of NT\$900. The median of the sample WTP is NT\$832 and the interquartile range is NT\$1,521. The predicted WTP seems to be uniformly distributed across the range.

Furthermore, since the estimates of the parameters may be inconsistent if the distribution specification is incorrect and the empirical results are sensitive to the choice of probability function, another non-parametric approach is also used to calculate the mean and median WTP which has been proposed by Kriström (1990). The advantage of the non-parametric approach is that the distribution function specification is not essential. In estimating the mean WTP, we assume that the highest WTP is NT\$3,500 (Kriström, 1990). Based on the distribution of responses illustrated in Table 1, the empirical survival function in this study is depicted in Figure 2. Figure 2 shows the relationship between the offered price asked in the WTP question and the proportion of respondents accepting the offered price. The nonparametric estimated mean can be calculated as the area bounded by the survival function and the median can be

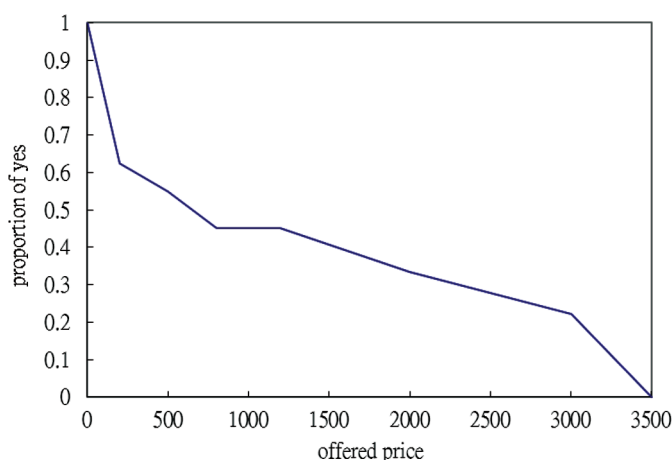


FIGURE 2 The empirical survival function.

TABLE 7
The Estimated Willingness to Pay (WTP) and Gross Domestic Product (GDP):
An International Comparison

	<i>Year</i>	<i>Estimated Annual WTP for PSB</i>	<i>GDP Per Capita (US\$)^a</i>	<i>WTP for PSB/GDP (%)</i>
BBC of the UK	2004	Total value: £23.50 per month = £282 per year = US\$522.22	36,256.87	1.14%
NHK of Japan	2006	WTP for terrestrial ¥1,780 per month = ¥21,360 per year = US\$183.58	34,263.65	0.53%
RTE of Ireland	2002	€21.05 per month = €252.6 per year = US\$287.04	31,394.15	0.91%
CBC of Canada	1998	\$5.03 CAD per month = \$60.36 CAD per year = US\$40.78	20,495.23	0.19%
PTS of Taiwan	2007	Use value = NT\$982 per year = US\$29.89	16,606.00	0.18%

^aSource: International Monetary Fund, World Economic Outlook Database, April 2008.

obtained by a linear interpolation approach. The mean and the median WTP based on the nonparametric method are about NT\$1,316 and NT\$650, respectively. Note that the Turnbull expected WTP estimate based on the distribution-free approach is also estimated. The Turnbull lower bound estimate of the expected WTP is about NT\$1,049 (Haab & McConnell, 2002). We find that the means are higher than the medians for both the parametric and nonparametric approaches. Furthermore, the parametric mean WTP is quite similar to the Turnbull lower bound estimated mean WTP. In summarizing the results, we can conclude that our estimates of the mean WTP for the PSB in Taiwan are all much more than NT\$150, which is the current government subsidy/budget for the PSB per household. Such high WTP estimates are indicative of quite a high level of appreciation of PSB among people in Taiwan. They also imply that an incentive exists for the government to invest more in funding PSB in Taiwan.

With this estimation, the mean WTP for the PSB in Taiwan and that in other countries can be compared simultaneously. GDP is used as an index to compare the WTP for PSB under the same benchmark. As shown in Table 7, the sample average WTP for the BBC is estimated to be US\$522.22 annually, which is about 1.14% of the GDP per capita in the U.K. It is a relatively high percentage among the five countries when compared with the 0.53% in Japan, 0.91% in Ireland, 0.19% in Canada, and 0.18% in Taiwan. The result is not surprising since the BBC really plays a dominant role in the media market in the UK. The estimated WTP in Taiwan, by the parametric method, is 0.18% of the GDP per capita for PSB, which is the lowest among the five countries. This result seems reasonable for a country with a very short history

of PSB. Furthermore, if we compare this result with the current cable price in Taiwan,⁶ such a result also indicates a strong demand for PSB on the part of citizens in Taiwan to provide high quality programs.

CONCLUDING REMARKS

We apply a dichotomous contingent valuation question, in which each respondent is asked if he/she is willing to pay an offered price or not. By diversifying the offered price in different sub-sample questionnaires, the relationship between the offered price and the proportion of respondents who are willing to pay can be derived. A binary discrete choice model, such as a Probit model, is applied in this study since the specification of the Probit model is consistent with the utility difference framework.

This study is the first study in Taiwan that attempts to estimate Taiwanese willingness to pay for PSB. We also investigate the public values that people attach to the PSB. The results are insightful in providing a better understanding of which factors influence people's WTP for such a public good. The research reports several important findings. First of all, this study determines the public functions that Taiwanese viewers expect the PTS to fulfill and their satisfaction with commercial broadcasting in this regard. Results indicate that "provide unbiased plural opinions on social and political issues," "provide educational programs to people of all ages," and "pass down the Taiwanese traditional arts and culture to the next generation" are prioritized functions for PSB to emphasize in the future. This is helpful in clarifying the PTS's position as a public service broadcaster and can also serve as a guide for the future direction and development of the PTS.

Secondly, the influence of respondents' socioeconomic characteristics and attitudes toward PTS are examined and their WTP estimated. Variables related to the usage of media, the respondents' satisfaction, and the gap between satisfaction and expectations are influential, whereas the effect of demographic variables is relatively small. The influences of usage variables are mitigated and attitudinal variables become important predictors of the respondents' willingness to pay for PSB. The results suggest that those with higher satisfaction and who do not think the PTS can be replaced by commercial broadcasting are more likely to be willing to pay.

Finally, this study has estimated the value of PSB in monetary terms. The estimated average household WTP for PSB per year is NT\$982. Furthermore, another of our nonparametric estimates of WTP is also robustly shown to be higher than the current government subsidy for the PSB per household which is approximately equal to NT\$150 per household per year. This result implies that the PSB could be underfunded and that its current appropriation is probably incommensurate with the value that the PTS has brought to the society.

It should be noted that the data used in this empirical study are unique but not without some limitations. This sample is small with only 376 observations, based on a telephone survey. The results obtained from this study should thus be interpreted with caution when the conclusions and implications are generalized and applied to a larger population in a broader

⁶Generally speaking, the cable price is about NT\$500 (US\$15.22) per month for more than 100 channels in Taiwan, including CNN, NHK, HBO, ESPN, and Star Movies.

context. Furthermore, our results for WTP may be inflated because of possible nonresponse bias or under-representation of young and aging groups in our sample. However, our estimates of WTP can still provide a useful reference to the government policymakers as they discuss and make the funding decisions. On the other hand, the WTP estimates can be seen as a measurable output, which the PTS can use when performing a cost-benefit analysis.

ACKNOWLEDGMENTS

We acknowledge the assistance on survey conduction from Chen-Wei Lin, a graduate research assistant, and the Center for Survey Research, Academia Sinica. The remaining errors are ours alone.

REFERENCES

- AAPOR. (2011). *Standard definitions—Final dispositions of case codes and outcome rates for surveys*. Retrieved from <http://www.aapor.org/Home.htm>
- British Broadcasting Corporation. (2004). *Measuring the value of the BBC: A report by the BBC and Human Capital*. London, UK: British Broadcasting Corporation & Human Capital.
- Blumenschein, K., Johannesson, M., Yokoyama, K. K., & Freeman, P. R. (2001). Hypothetical versus real willingness to pay in the health care sector: Results from a field experiment. *Journal of Health Economics*, 20, 441–457.
- Blumenschein, K., Blomquist, G., Johannesson, M., Horn, N., & Freeman, P. (2008). Eliciting willingness to pay without bias: Evidence from a field experiment. *Economic Journal*, 118, 114–137.
- Bowker, J., & Stoll, J. (1988). Use of dichotomous choice nonmarket methods to value the whooping crane resource. *American Journal of Agricultural Economics*, 70, 372–381.
- CASBAA. (2008). *Taiwan's digital gap: Regulation and development of Taiwan's pay-TV industry*. Hong Kong: The Cable & Satellite Broadcasting Association of Asia (CASBAA).
- Chyi, H. I. (2005). Willingness to pay for online news: An empirical study on the viability of the subscription model. *Journal of Media Economics*, 18, 131–142.
- Delaney, L., & O'Toole, F. (2004). Irish public service broadcasting: A contingent valuation analysis. *Economic and Social Review*, 35, 321–350.
- Delaney, L., & O'Toole, F. (2006a). The distributional effects of state-financed broadcasting. *Journal of Media Economics*, 19, 83–98.
- Delaney, L., & O'Toole, F. (2006b). Willingness to pay: Individual or household? *Journal of Cultural Economics*, 35, 305–309.
- Finn, A., McFadyen, S., & Hoskins, C. (2003). Valuing the Canadian broadcasting corporation. *Journal of Cultural Economics*, 27, 177–192.
- Finn, A., McFadyen, S., Hoskins, C., & Hupfer, M. (2001). Quantifying the sources of value of a public service. *Journal of Public Policy & Marketing*, 20, 225–239.
- Haab, T., & McConnell, K. (2002). *Valuing environmental and natural resources: The econometrics of non-market valuation*. Northampton, MA: Edward Elgar Publishers.
- Hanemann, W. (1984). Welfare evaluation in contingent valuation experiments with discrete responses. *American Journal of Agricultural Economics*, 66, 332–341.
- Holtz-Bacha, C., & Norris, P. (2001). To entertain, inform, and educate: Still the role of public television. *Political Communication*, 18, 123–140.
- Johannesson, M., Jönsson, B., & Borgquist, L. (1991). Willingness to pay for antihypertensive therapy: Results of a Swedish pilot study. *Journal of Health Economics*, 10, 461–474.
- Krström, B. (1990). A non-parametric approach to the estimation of welfare measures in discrete response valuation studies. *Land Economics*, 66, 135–139.

- Noonan, D. S. (2003). Contingent valuation and cultural resources: A meta-analytic review of the literature. *Journal of Cultural Economics*, 27, 159–176.
- O'Hagan, J., & Jennings, M. (2003). Public broadcasting in Europe: Rational, license fee and other issues. *Journal of Cultural Economics*, 27, 31–56.
- Papandrea, F. (1999). Willingness to pay for domestic television programming. *Journal of Cultural Economics*, 23, 149–166.
- Phillips, K. A., Homan, R. K., Luft, H. S., Hiatt, P. H., Olson, K. R., Kearney, T. E., & Heard, S. E. (1997). Willingness to pay for poison control centers. *Journal of Health Economics*, 16, 343–357.
- Santagata, W., & Signorello, G. (2000). Contingent valuation of a cultural public good and policy design: The case of “Napoli Musei Aperti.” *Journal of Cultural Economics*, 24, 181–204.
- Schwer, R., & Daneshvary, R. (1995). Willingness to pay for public television and the advent of “look-alike” cable television channels: A case study. *Journal of Media Economics*, 8(3), 95–109.
- Throsby, C. (2003). Determining the value of cultural goods: How much (or how little) does contingent valuation tell us? *Journal of Cultural Economics*, 27, 275–285.
- Throsby, C., & Withers, G. (1986). Strategic bias and demand for public goods: Theory and application for the arts. *Journal of Public Economics*, 31, 307–327.
- Tsuji, M. (2007). Assessing performance on NHK promises: Methods and approaches. *NHK Broadcast Studies*, 5, 1–28.
- Tsuji, M., & Miyahara, S. (2007). *Value of Japanese public service broadcasting in the convergence of broadcasting and telecommunications*. Eighteenth European Regional ITS Conference, Istanbul, Turkey.