

Measuring the Value of Japanese Public Broadcasting in the Age of Convergence of Broadcasting and Telecommunications

Masatsugu Tsuji
Graduate School of Applied Informatics, University of Hyogo
tsuji@ai.u-hyogo.ac.jp

and

Shoichi Miyahara
Faculty of Economics, Aoyama Gakuin University

Abstract

In accordance with the convergence of broadcasting and telecommunications, media are becoming increasingly diversified and public broadcasting all over the world face new challenges. In cope with this, BBC in UK and RTE in Ireland, for instance, analyze their values as a public broadcasting and whether current fees are appropriate from the viewers' perspective in order to determine future strategies as a public broadcasting. This paper analyzes the value of Japanese public broadcasting NHK (*Nippon Hoso Kyokai*) by conducting questionnaire surveys in April 2006, which interviewed among 3,600 men and women aged 16 and over throughout Japan, selected by stratified two-stage random sampling, and 2,018 valid replies were obtained. Questionnaires were based on the three-stage double bound model. According to our estimation, respondents were willing to pay 1,780 yen (approximately US\$ 15.50) monthly per viewer for terrestrial services (NHK General, NHK Educational, NHK Radio 1, NHK Radio 2, NHK FM) and 1,245 yen (about US\$ 10.83) monthly per viewer for satellite services (NHK BS-1, NHK BS-2, NHK Hi-vision). These amounts are higher than current viewing fees (1,395 yen monthly for a color TV contract, plus an additional 945 yen monthly for color satellite broadcasts). We also analyze factors such as viewers' characteristics and roles of public broadcasting which affect WTP by making use of the Logit methods. We confirmed that "delivering better quality of programs" and "avoiding receiving fee evasion," are identified as particularly important for higher WTP. These factors would be helpful for establishing future management strategies to increase the public value of NHK.

INTRODUCTION

In accordance with the convergence of broadcasting and telecommunications, media are becoming increasingly diversified and public broadcasting all over the world face new challenges. Challenges come from severer competition in the broadcasting industry. The share of public broadcasting has been steadily decreasing by the entrance in new entrants such as private broadcasting, cables and satellite. In cope with these, public broadcasting have to determine long-term strategy for strengthen its finance and managerial foundations. Coming digital broadcast (or digital television) is expected to increase these transformations further. Other challenges are deregulation or privatization since 1980s. Although public broadcasters were not privatized, they had to introduce reforms by aiming efficient management by focusing on problems such finance, reduction of costs and the accountability and governance of management.¹⁾

Facing these transformations, public broadcastings reform themselves in such a way to strength their financial and managerial basis such as starting new services to distribute their contents via the Internet and increasing transparency of the decision processes in management. In this context, they analyze their values as a public broadcasting and whether current fees are appropriate from the viewers' perspective. In so doing, Contingent Valuation Method (CVM) has been extensively utilized.²⁾ This method is effective not only to calculate willingness to pay (WTP) for the Cost/Benefit Analysis but also to determine future strategies as a public broadcasting. As for the latter, by making use of suitable estimation methods, factors to promote WTP are identified, in other words, value drivers of strengthen nature and characteristics of public broadcasting can be derived. In addition, CVM can be applied for improving accountability of management and decision-making processes.

This paper aims to access public values of NHK (*Nippon Houso Kyoukai*:

Japanese Association of Broadcasting) by applying CVM. Our work to accessing NHK's WTP is not first in this field. From 1975 to 76, Onoe and Sakamoto [1979] initiated earlier attempt to access NHK by CVM even in a primitive way.³⁾ It should be noted that it is also quite early in the world. This paper is followed by experiences of CVM conducted by various public broadcasters such as BBC of UK, RTE of Ireland, and CBC of Canada, and so on, and the exact amounts of public values are estimated. In addition to accessing values, this paper analyzes how NHK's "Promises" announced in 2005 affect the values, in other words, how viewers respond to them and how WTP is affected. This is important issues when considering managerial strategy for a public broadcaster in the future.

The paper consists of five chapters, Chapter one shows the framework of CVM in details such as methods, questionnaires, and detailed question survey of this paper is presented in Chapter 2. Chapter 3 provides estimated WTP and presents some applications by using WTP. Factors affecting WTP are extensively analyzed in the next chapter, three analyses are examined, namely, relationships between WTP and respondents' characteristics, NHK's promises, and public values of NHK. Conclusion based on these analyses is briefly stated in the last chapter.

1. CVM ANALYSIS OF NHK BROADCASTING SERVICES

This section discusses important basis for question surveys by applying CVM, and compares with surveys of different countries from the viewpoint of perspectives and methodologies.

1.1 Country Perspectives in CVM Analysis

CVM analyses of public broadcasting in different countries have different content and analysis methods. Here we show some important aspects by pointing the similarities and differences with these countries with regard to the evaluation of the NHK “Promises”.

Aim

The aim of a CVM survey is generally the same in all countries. This type of survey seeks to analyze the value of public broadcasting and whether current fees are appropriate from the viewers’ perspective, at a time when media are becoming increasingly diversified. This paper analyzes how NHK’s promises and its efforts are accessed by viewers.

Survey methodology

Taking budget limitations into consideration, the survey method should be as bias-free as possible within those constraints. All survey methods—home interview, Internet, mail, telephone—have advantages and disadvantages, and there is no “best” method.⁴⁾ Similarly, Internet surveys limit the pool of respondents to Internet users, so they are inappropriate for estimating WTP among a broad segment of the general public. On the other hand, when analyzing somewhat future-oriented trends asking about the types of media from which people will obtain broadcast contents in the digital age, it is more appropriate to ask Internet users, who are already engaged with this media.

1.2 Framework of NHK Survey

The NHK promise survey adopted personal interviews on a nationwide basis, surveying as many respondents as possible and reflecting the views of audience as accurately as possible in terms region, age, gender, and other respondent characteristics. In CVM, many different formats—open-end, closed-end, double bound, etc.—have been developed for the WTP question format, and the characteristics of WTP obtained

from these are also analyzed. The method used depends on the aim of the analysis and the research accumulated by the researchers until then. To simply estimate the amount of WTP, the double bound model is used, but in terms of evaluating NHK's "Promises,"⁵⁾ in addition to WTP itself, we want to clarify here factors determining its WTP and also hope that this would be helpful for management strategies to increase viewers' WTP. Up to now, we have identified WTP and factors influencing WTP when analyzing economic ratings of health care and roads, using the three-stage double bound model, and the Logit, Probit and Tobit methods⁶⁾ Our most important reason for choosing these methods were that we could apply this kind of accumulated past research..

In April 2006, a questionnaire survey regarding CVM was conducted in the form of personal interviews among 3,600 men and women aged 16 and over throughout Japan, selected by stratified two-stage random sampling. Respondents were divided into two groups, those asked about WTP and those asked about WTA (willingness to accept). They were asked about WTP and WTA for terrestrial television services (NHK General, NHK Educational, NHK Radio 1, NHK Radio 2, NHK FM) and satellite services (NHK BS-1, NHK BS-2, NHK Hi-vision), with scores tabulated to calculate the monetary value of NHK broadcasting services. The valid response rate to this survey was 56.1 percent. The 2,018 respondents were 1,009 WTP respondents and 1,009 WTA respondents, who were asked the questions below. In the text of the questions, respondents are asked about a base amount of ¥1,500, but after this question, they are asked a second time concerning a lower or higher amount, based on their answer to the question the first time, and the amount was again adjusted up or down, based on their answer. In order to reveal the true value, we follow the standard method of questionnaire survey developed in the field of environment economics, for instance. In the questionnaire survey, the following texts were mentioned to respondents.

Text of the WTP question

Assume that NHK's existing receiving fee has been eliminated.

Based on that assumption, are you willing to play ¥1,500 per month to watch/listen to NHK's existing NHK General and NHK Education television and radio programs? This money will be used appropriately as a 'receiving fee' for creating programs provided by NHK and to support development of broadcasting technology and other operations necessary for maintaining public broadcasting. Since this amount is a monthly payment, please consider the effect that this amount will have on your household budget when answering.

Please note that answering this question will not affect the receiving fee you pay to NHK.

Text of the WTA question

This is a question about the value of public broadcasting. Everything in this question is an assumption, so please answer based on this assumption.

Assume that NHK discontinues broadcasting services. NHK has provided broadcasting services useful for the public, including you, and in compensation NHK will pay you money in perpetuity. No taxes or other public funds will be used for this. Taking these points into consideration, would you be willing to accept no longer being able to watch/listen to NHK's existing NHK General and NHK Education television and radio programs in exchange for compensation of ¥1,500 per month?

Please note that answering this question will not affect the receiving fee you pay to NHK.

After mentioning the above statements, three stage dichotomous method is used

for asking WTP and WTA, which is one of the standard methods to obtain true values of respondents. The questionnaire survey related to WTP is as follows: To begin with we decide the initial value, which is the first amount to be asked to respondents. 1,500 yen (approximately US\$12.50) is selected as the initial value, since we expect the variation of replies are not widely distributed from the current viewing fees.⁸⁾ We begin by asking whether they would be willing to pay monthly viewing fees of 1,500 yen. If their answer is “yes,” we then ask whether they would be willing to pay 2,500 yen (US\$20.83). If they reply “yes” again to 2,500 yen, then they are asked to answer the amount in mind. The amount they reveal is their WTP. When they are asked whether they would be willing to pay 2,500 yen, if they reply “no,” then we lower the amount to 2,000 yen (US\$54.17). If they reply “yes” to 2,000 yen, then that is their WTP. If again their answer is “no,” then we can determine their WTP is 1,500 yen. If they reply “no” to 1,500 yen (US\$12.5), we repeat this process by lowering the amount in the same manner until their WTP is determined. The tree of questions is shown in Figure 1.

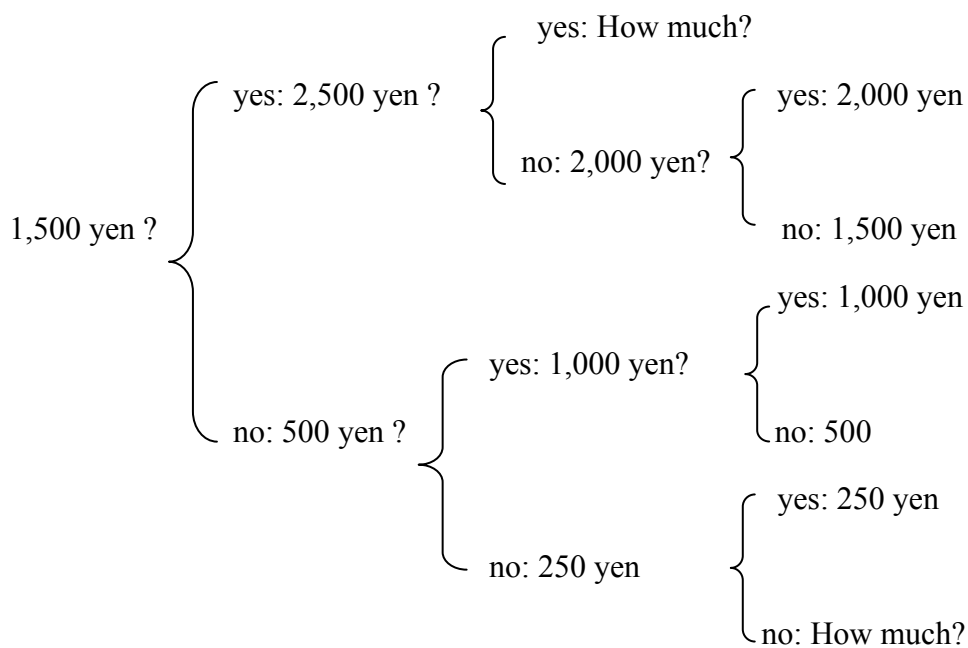


Figure 1 Three stage dichotomous process

In the case of the WTA question, valid responses were received from 326 people (reply rate: 32.3%) for the terrestrial services (NHK General, NHK Educational, NHK Radio 1, NHK Radio 2, NHK FM) group and 211 (reply rate: 21.9%) for the satellite services (NHK BS-1, NHK BS-2, NHK Hi-vision) group. Since the number of valid responses received was smaller than necessary for achieving a significant estimation, we did not analyze the WTA estimate in detail. The large number of respondents who refused to answer the WTA question is indicative of their negative feelings toward NHK dropping broadcast services.⁹⁾

When calculating the WTP used in CVM, we designated the number of respondents, including those answering “0 yen” the universe and calculated WTP within the range of a maximum of 10,000 yen in the case of terrestrial services and 5,000 yen in the case of satellite services. Figures 1 and 2 show respondent distributions of WTP.¹⁰⁾

Table 1 Distribution of WTP for Terrestrial Services

Value (yen)	No answer	0	250	500	1,000	1,500	2,000
No. of response	2	1	30	156	96	212	83
Value (yen)	2,500	3,000	3,500	4,000	5,000	10,100	
No. of response	57	31	2	1	7	1	

Table 2 Distribution of WTP for Satellite Services

Value (yen)	No answer	0	250	500	750	1,000	1,250
No. of response	2	6	40	89	24	150	39
Value (yen)	1,500	2,000	2,500	3,000	4,000	5,000	
No. of response	65	21	7	14	2	2	

2.2 Estimation of WTP

Based on the above replied WTP of each user, we estimate the demand function of for services; more precisely, we estimate the probability of acceptance to amounts questioned and the number of users who will agree to pay. The functional form of demand to be estimated is assumed to be logistic, namely,

$$\text{Probability of acceptance} = 1 - 1/(1 + \exp(-\alpha - \beta \log \text{WTP})).$$

The probability of acceptance is the ratio of the number of users who reply that they are willing to use the device at the amount of charges provided in the questions. By plotting the probability of acceptance for the respective WTP along the logistic curve shown above, and parameters α and β are estimated. The estimated coefficients α and β are summarized in Table 3, and resulting estimated logistic curves are indicated in Figure 2 and 3.

Table 3 Estimation of Logistic Curves (Terrestrial services)

	Estimated	Standard error	<i>t</i> -value	<i>p</i> -value
α	19.7136768	0.62496436	31.544	0
β	2.71663618	0.08950838	30.351	0

Log likelihood function: -1429.557

Table 3 Estimation of Logistic Curves (Satellite services)

	Estimated	Standard error	<i>t</i> -value	<i>p</i> -value
α	20.6454558	0.7876612	26.211	0
β	2.97236473	0.11553995	25.726	0

Log likelihood function: -1035.871

The WTP is obtained by calculating the area below the logistic curve. According

to our estimates, respondents were willing to pay 1,780 yen (US\$14.83) monthly per viewer for terrestrial services (NHK General, NHK Educational, NHK Radio 1, NHK Radio 2, NHK FM) and 1,245 (US\$10.38) yen monthly per viewer for satellite services (NHK BS-1, NHK BS-2, NHK Hi-vision). These amounts are higher than current viewing fees (1,395 yen monthly for a color TV contract, plus an additional 945 yen monthly for color satellite broadcasts, when collected by a fee collector) calculated based on accumulated expenses.

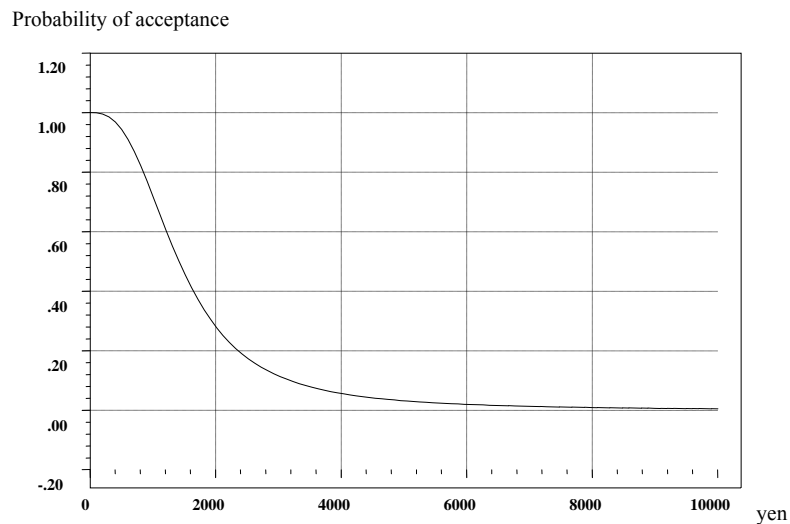


Figure 2 Estimated logistic curve for Terrestrial services

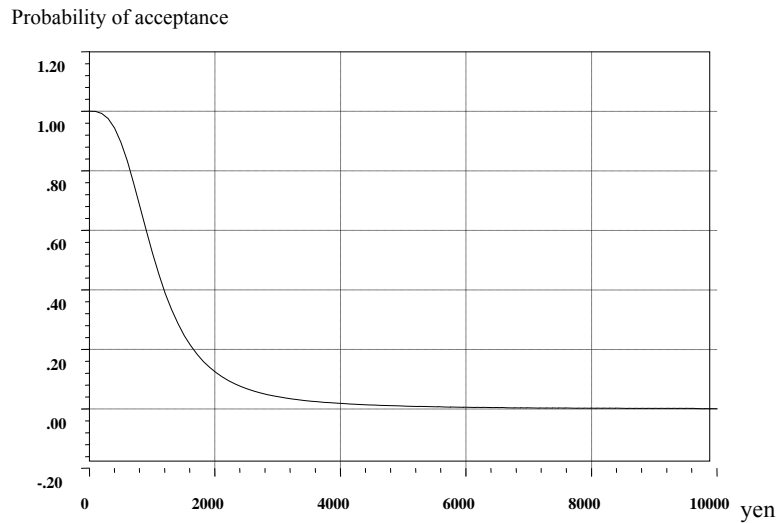


Figure 3 Estimated logistic curve for Satellite services

2.3 VFM of NHK Broadcasting Services

As an application of WTP, we calculate Value for Money (VFM) of NHK broadcasting services, which indicates the comparison of total benefits of services with total costs. The former can be calculated the following formula: [WTP (Terrestrial services) x 12 (months) x number of its contracted subscribers] + [WTP (Satellite services) x 12 (months) x number of its contracted subscribers], while total costs are obtained from the NHK budget 2004 reported to the Diet. The total benefits amounts to 994.8 billion yen (US\$8.3 billion), while the latter 659.2 billion yen (US\$5.5 billion), and thus VFM is about 1.51. As for FY 2005, total benefits are 988.8 billion yen (US\$8.2 billion) and total costs 630.0 billion yen. Thus, VFM is about 1.57. VFM increases from FY 2004 to FY 2005.¹¹⁾

Each respondent is asked to relative importance for each of the respective terrestrial services (NHK General, NHK Educational, NHK Radio 1, NHK Radio 2, NHK FM) and for those of satellite services (NHK BS-1, NHK BS-2, NHK Hi-vision).

By multiplying those ratios by WTP, we obtained WTP of each service, which is indicated by Table 4.

Table 4 WTP of Each Service

Terrestrial services	1,780	US\$14.83
NHK General,	1,137	9.48
NHK Educational	348	2.9
NHK Radio 1	136	1.15
NHK Radio 2	73	0.61
NHK FM	86	0.72
Satellite services	1,245	US\$10.38
NHK BS-1	523	4.36
NHK BS-2	423	3.53
NHK Hi-vision	299	2.49

3. FACTORS AFFECTING WTP

Based on WTP of each respondent, we attempt to extract factors which affect their values by fully using econometric method. Since there are so many factors which affect WTP, in order to simplify the analysis, we divide them into three categories: (i) respondent characteristics; (ii) viewers' satisfaction with NHK's "Promises" to restore viewers' trust; and (iii) public value of NHK.

3.1 Viewers' Characteristics and WTP

At first, the relationship between respondents' characteristics and their WTP (Terrestrial services) is examined. As characteristics, (i) age, (ii) occupation, (iii) number of family; (iv) income; and (v) regions and cities where they reside. The

summary statistics is provided in Table 5. The result of estimation for terrestrial broadcast is summarized in Table 6. For the actual estimation, two models are estimated: (i) full model and (ii) selected model. The former takes all variables into account, while (ii) selects variables by making use of the Akaike Information Criterion [AIC].¹²⁾

The results of estimation on terrestrial services show that two models have the almost same significant variables. Variables which affect strongly WTP are such as “age,” “satisfaction with NHK’s program,” and residents of “cities with 100-300 thousand population”. These are significant at the 1% level. “Manager, professional occupations,” “income,” and “cities with less than 100 thousand population” are significant at the 5% level. “Cities with more than 300 thousand population” and “Chubu region” are those of 10% level, but the latter has negatively related to WTP. Among these factors, “age” is consistent with other data such that senior people tends have higher satisfaction with NHK. In addition, NHK is viewed rather in the rural area than in the metropolitan areas, which coincide with this result. “Viewing hours,” on the other hand, does not affect their WTP, but “satisfaction with NHK’s program” does WTP. It should be noted that this result is exactly same as Onoe and Sakamoto [1979].¹³⁾

The same estimation is conducted to satellite service, and only full model is estimated. The results of estimation on satellite services show that variables which affect strongly WTP are such as “age,” “satisfaction with NHK’s program”. Hokkaido and Tohoku regions are significant at a 5% significance level, while Kinki region at a 10% significance level. Other regions are not significant for satellite service. Populations of residents are not significant either. Regarding occupations, self-employed (0.16), factory workers (1.88), and students (-0.71) are significance with 10% significant level. The sign of coefficient of students is negative. Income is not

significant either. “Q2: viewing hours,” and “Q6 (1): satisfaction with NHK’s program” provide positive influence to WTP.

Table 5 summary Statistics (Characteristics)

Variables	No. of observation	Average	Standard variation	Minimum	Maximum
Q2	408	3.53	2.05	0	9
Q6 (1)	408	0.63	0.48	0	1
Q6 (2)	408	0.49	0.5	0	1
Age	408	55.16	15.26	17	92
Agriculture and fishery	408	0.03	0.16	0	1
Self-employed	408	0.13	0.33	0	1
Manager and professional	408	0.03	0.17	0	1
Sales/service	408	0.04	0.19	0	1
Factory worker	408	0.09	0.29	0	1
Office worker, engineer	408	0.12	0.32	0	1
Housewife	408	0.24	0.43	0	1
student	408	0	0.07	0	1
Number of family	408	3.1	1.47	1	9
income	408	3.44	1.81	1	9
Hokaido/Tohoku region	408	0.15	0.35	0	1
Kanto/Koushinetsu region	408	0.28	0.45	0	1
Chubu region	408	0.18	0.39	0	1
Kinki region	408	0.16	0.36	0	1
Chugoku/Shikoku region	408	0.11	0.31	0	1
Ordinance-designated city	408	0.19	0.39	0	1
City with more than 300 thous. Population	408	0.24	0.42	0	1
City with 100-300 thous. Population	408	0.24	0.42	0	1
City with less than 100 thous. Population	408	0.21	0.41	0	1

Table 6 WTP and Respondents' Characteristics (Terrestrial services)

	Full model			Selected model		
	coefficient	t-value		coefficient	t-value	
constant	24.83	17.3	***	24.56	18.96	***
ln(WTP)	3.74	19.52	***	3.7	20.56	***
Q2	-0.01	-0.2				
Q6 (1)	0.86	4.37	***	0.86	4.49	***
Q6 (2)	-0.29	-1.51	+	-0.32	-1.72	*
age	0.03	3.7	***	0.03	4.69	***
Agriculture and fishery self-employed	0.52	0.81				
Manager and professional	-0.05	-0.17				
Sales/service	1.37	2.49	**	1.57	3.02	***
Factory worker	-0.52	-0.95				
Office worker, engineer	-0.12	-0.33				
Housewife	-0.24	-0.73				
Student	-0.39	-1.52	+	-0.34	-1.55	+
Number of family	-0.7	-0.73				
Income	-0.01	-0.14				
Hokkaido/Tohoku region	0.13	2.07	**	0.13	2.49	**
Kanto/kousinetsu region	0.34	0.92				
Chubu region	-0.24	-0.73				
Kinki region	-0.62	-1.83	*	-0.53	-2.29	**
Chugoku/Shikoku region	-0.04	-0.11				
Ordinance-designated city	-0.24	-0.62				
City with more than 300 thous. population	0.42	1.23				
City with 100-300 thous. population	0.53	1.71	*			
City with less than 100 thous. population	0.88	2.81	***	0.49	2.25	**
	0.78	2.41	**	0.48	2.06	**
No. of observation	408			408		
Log likelihood	691.35			695.97		

***, **, and * indicate the 1%, 5%, and 10% significant level, respectively

Table 7 WTP and Respondents' Characteristics (Satellite services)

	Full model		Selected model	
	coefficient	t -value	coefficient	t -value
constant	17.26	13.52		***
ln(WTP)	2.69	16.05		***
Q2	0.09	1.41		+
Q6 (1)	0.47	2.02		**
Q6 (2)	-0.08	-0.33		
age	0.02	2.25		**
Agriculture and fishery	-0.06	-0.71		
self-employed	0.16	2.30		**
Manager and professional	-0.33	-0.47		
Sales/service	0.11	0.32		
Factory worker	1.88	2.17		**
Office worker, engineer	0.91	1.46		+
Housewife	0.56	1.28		
Student	-0.71	-2.07		**
Number of family	-0.33	-1.05		
Income	-0.37	-0.48		
Hokkaido/Tohoku region	0.98	2.15		**
Kanto/kousinetsu region	-0.02	-0.04		
Chubu region	-0.09	-0.23		
Kinki region	0.87	1.96		*
Chugoku/Shikoku region	0.49	1.16		
Ordinance-designated city	0.09	0.26		
City with more than 300 thous. population	0.21	0.57		
City with 100-300 thous. population	0.39	1.10		
City with less than 100 thous. population	0.39	1.03		
No. of observation	299			
Log likelihood	577.09			

***, **, and * indicate the 1%, 5%, and 10% significant level, respectively

3.2 NHK “Promise” and WTP

Regarding (ii), a detailed explanation is required. In accordance with consecutive improprieties, NHK announced “Promise” in order to restore its confidence, which is indicated in Table 8. In the questionnaire survey, we asked how much viewers are

satisfied with NHK’s efforts to fulfill the duties (Question 9). “Promises” consist of six main promises and nine subsidiary items, and we take reviewers’ satisfaction with these promises as variables. In the actual estimations, we omitted some of them because of duplication, and utilize only twelve main promises and subsidiary items as variables. Summary statistics is shown in Table 9 and that of results in Table 10. In this estimation, we attempt to analyze which one(s) of twelve promises raise the value of WTP.

Table 8 Summary of NHK “Promises”

Q9 SQ (1)	Creates better programs consistent with receiving fees paid
Q9 SQ (2)	Covers appropriately the issues Japan faces and broadcasts programs providing information helpful for thinking and deciding about those issues
Q9 SQ (3)	Improves emergency broadcasting to respond promptly to threat to human life and property
Q9 SQ (4)	Broadcasts programs contributing to the benefit of local society
Q9 SQ (5)	Tailors broadcasts to better meet of seniors and persons with disabilities
Q9 SQ (6)	Broadcasting programs contributing the healthy development of children, the future of Japan, and the stimulation of receptive intellectual curiosity
Q9 SQ (7)	Works to promote understanding of the receiving fees and ensures that the burden is borne equitably
Q9 SQ (8)	Establishes strong relationship with viewers and reflects their opinions in our operation
Q9 SQ (9)	Stamps out improprieties and operates in a transparent manner and with full accountability, to restore the public’s trust in NHK
Q9 SQ (10)	Reduces costs and carry out operations effectively and efficiently
Q9 SQ (11)	Makes greater efforts to develop and spread digital broadcasting so as to improve viewers access to it
Q9 SQ (12)	Develops digital technology and new services using this technology to improve the public’s convenience

Source: NHK “Promises” Evaluation Committee [2006] and Tsuji [2007]

In these estimations, few variables are extracted as significant,¹⁴⁾ namely “creates better programs consistent with receiving fees paid” (1% level) in the full model, in addition to this, “establishes strong relationship with viewers and reflects their opinions in our operation” (5% level) and “broadcasts program contributing the benefit of local society” (10% level) are found to be significant in the selected model. One way to restore viewers’ confidence is to broadcast high quality programs.¹⁵⁾

Table 9 Summary Statistics (NHK “Promises”)

Variables	No. of observation	Average	Standard variation	Minimum	Maximum
Q9 SQ (1)	658	0.5	0.5	0	1
Q9 SQ (2)	658	0.54	0.5	0	1
Q9 SQ (3)	658	0.72	0.45	0	1
Q9 SQ (4)	658	0.48	0.5	0	1
Q9 SQ (5)	658	0.46	0.5	0	1
Q9 SQ (6)	658	0.45	0.5	0	1
Q9 SQ (7)	658	0.21	0.41	0	1
Q9 SQ (8)	658	0.25	0.43	0	1
Q9 SQ (9)	658	0.2	0.4	0	1
Q9 SQ (10)	658	0.2	0.4	0	1
Q9 SQ (11)	658	0.29	0.45	0	1
Q9 SQ (12)	658	0.3	0.46	0	1

Table 10 WTP and NHK “Promises”

	Full model			Selected model		
	coefficient	t -value		coefficient	t -value	
constant	23.6	25.98	***	23.56	26.1	***
ln(WTP)	3.35	25.93	***	3.34	26	***
Q9 SQ (1)	0.9	4.94	***	0.92	5.08	***
Q9 SQ (2)	0.28	1.37	+	0.3	1.58	+
Q9 SQ (3)	0.2	1.1				
Q9 SQ (4)	0.3	1.5	+	0.33	1.8	*
Q9 SQ (5)	-0.2	-1.02				
Q9 SQ (6)	-0.3	-1.5	+	-0.26	-1.48	+

Q9 SQ (7)	0.13	0.49			
Q9 SQ (8)	0.29	1.15	0.43	2.2	**
Q9 SQ (9)	0.06	0.19			
Q9 SQ (10)	0.15	0.5			
Q9 SQ (11)	0.31	1.04			
Q9 SQ (12)	-0.17	-0.6			
<hr/>					
No. of observation	658		658		
Log likelihood	1169.45		1172.25		
<hr/>					

***, **, and * indicate the 1%, 5%, and 10% significant level, respectively

3.3 Value Analysis of Public Broadcasting

Viewers and listeners perceive many different values from public broadcasting, and it is a role of public broadcasting to make those values a reality. This insight clarifies what are public values that NHK should seek and fulfill. This analysis is aimed to clarify NHK's positioning as a medium and serve as an important element when considering NHK as a public broadcaster even in the future. In this context, NHK's public nature was broken down into nineteen categories and viewers' expectations of and satisfactions with NHK were questioned, which list is shown in Table 11. NHK today is perceived by viewers and listeners as fulfilling many of the values of public broadcasting, but both expectations and satisfaction were very strong regarding broadcasting during emergencies or disasters, speedy and accurate reporting, and

world-class sports. On the other hand, there were relatively large gaps between expectations and satisfaction relating to “passing on Japanese traditions and culture to the younger generation through audio and video,” “trying to close the information gap that exists among the public,” “creating new program formats that go beyond the existing program framework,” “presenting programs that are well received internationally” and “actively communicating events in Japan, Japanese history and culture, and information about Asia to the world”.¹⁶⁾

Regarding variables of category (iii), we analyze the statistical relationship between these public roles and WTP. This analysis helps NHK to consider its position as a public broadcast. The summary statistics and result of estimation is shown in Table 9 and 10, respectively.

The estimation in the selected model extracts the following three factors have positive relationship with WTP, namely, “Q10(4): Takes up broad issues from the through Japanese society and provides information that people can share and discuss,” “Q10(19): Passes on Japanese traditions and culture to the younger generations in audio and video format,” and “Q10(1): Products programs that are not influenced by advertisers or sponsors”. This implies that respondents who replied “yes” to those questions tend to reply higher WTP. It also, however, identifies following two with negative relationship, that is, “Q10(3): Provides information on disasters quickly and accurately,” and “Q10(11): Provides people of all age with opportunity to learn”. This is a contradiction to their replies to these questions. 96.3% (85.5%) of respondents replied “yes” to Q10(3) (Q10(11)). This is due to a limitation of econometric analysis, that is, the model cannot identify factors which almost all reply “yes”. In this account, we need further investigation.¹⁷⁾ The summary of statistics and the result is shown in Table 12 and 13, respectively.

Table 11 List of Public Values of Broadcasting

Q10 (1)	Products programs that are not influenced by advertisers or sponsors
Q10 (2)	Provides information on politics, the economy, public security and accurately
Q10 (3)	Provides information on disasters quickly and accurately
Q10 (4)	Takes up broad issues from the through Japanese society and provides information that people can share and discuss
Q10 (5)	Presents, in a far and neutral manner, diverse opinions on political or other issues on which views diverge
Q10 (6)	Presents various modes of society and values helping the public be more tolerant and feel sense of solidarity with other
Q10 (7)	Endeavours to close the information gap among people
Q10 (8)	Creates new programs formats that go beyond existing program frameworks
Q10 (9)	Broadcasts programs that have been painstakingly researched and produced
Q10 (10)	Provide programs that are well-received internationally
Q10 (11)	Provides people of al age with opportunity to learn
Q10 (12)	Creates programs of high cultural and artistic value that contribute to the advancement of Japan's artistic culture
Q10 (13)	Provides programs in popular entertainment genres such as variety or animation
Q10 (14)	Broadcasts soprts programs an events such as the Olympics that attract strong world widen interest
Q10 (15)	Actively covers and broadcasts non-mainstream sportrs
Q10 (16)	Actively communicates events in Japan, Japanese history and culture, and information about Asia to the world
Q10 (17)	Is actively involved in developing new type of services (for example, providing programs over the Internet)
Q10 (18)	Collects and maintains visual archives that are a precious legacy from the past, to preserve them for future generations and put them at the public's disposal
Q10 (19)	Passes on Japanese traditions and culture to the younger generations in audio and video format

Table 12 Summary Statistics (Public Values)

Variables	No. of observation	Average	Standard variation	Minimum	Maximum
Q10 (1)	663	0.81	0.39	0	1
Q10 (2)	663	0.93	0.25	0	1
Q10 (3)	663	0.96	0.19	0	1
Q10 (4)	663	0.8	0.4	0	1
Q10 (5)	663	0.84	0.37	0	1
Q10 (6)	663	0.72	0.45	0	1
Q10 (7)	663	0.76	0.43	0	1
Q10 (8)	663	0.69	0.46	0	1
Q10 (9)	663	0.83	0.38	0	1
Q10 (10)	663	0.79	0.41	0	1
Q10 (11)	663	0.83	0.38	0	1
Q10 (12)	663	0.84	0.36	0	1
Q10 (13)	663	0.48	0.5	0	1
Q10 (14)	663	0.91	0.28	0	1
Q10 (15)	663	0.62	0.49	0	1
Q10 (16)	663	0.83	0.38	0	1
Q10 (17)	663	0.56	0.5	0	1
Q10 (18)	663	0.82	0.38	0	1
Q10 (19)	663	0.84	0.37	0	1

Table 13 WTP and Public Values

	Full model			Selected model		
	coefficient	t -value		coefficient	t -value	
constant	23.44	24.52	***	23.29	25.1	***
ln(WTP)	3.21	25.81	***	3.19	25.98	***
Q10 (1)	0.31	1.43	+	0.38	1.85	*
Q10 (2)	0.33	0.95				
Q10 (3)	-0.94	-2.05	**	-0.82	-2.04	**
Q10 (4)	0.51	2.1	**	0.56	2.83	***
Q10 (5)	-0.09	-0.34				
Q10 (6)	0.23	1.07				
Q10 (7)	-0.13	-0.61				
Q10 (8)	0.14	0.73				
Q10 (9)	0.37	1.44	+	0.36	1.48	+
Q10 (10)	-0.45	-1.87	*	-0.33	-1.51	+
Q10 (11)	-0.48	-2.1	**	-0.37	-1.75	*
Q10 (12)	0.34	1.42	+			
Q10 (13)	0.08	0.49				
Q10 (14)	-0.15	-0.56				
Q10 (15)	-0.17	-1.04				
Q10 (16)	-0.25	-1.07				
Q10 (17)	0.03	0.2				
Q10 (18)	0.05	0.2				
Q10 (19)	0.46	1.87	*	0.41	2.01	**
No. of observation	663			663		
Log likyhood	1208.89			1212.43		

***, **, and * indicate the 1%, 5%, and 10% significant level, respectively

4. Value of Public Broadcasting in Other Countries

As stated earlier, public broadcasters are also engaging in measuring their values, and here we compare with results obtained so far. Discussions here are based on Ichikawa [2007].

United Kingdom

a. BBC 2004

In the United Kingdom, CVM is an established element for explaining costs and

benefits,¹⁸⁾ with CVM being used by public broadcaster BBC to measure itself in terms of its vision when renewing its broadcast charter. Results of CVM are as follows regarding amounts for license fees.¹⁹⁾

- Period: May 2004
- Survey target: 2,257 (survey on total value: 1,136; survey on consumer value: 1,121)
- Survey method: personal interviews
- Question method: The BBC's total value and consumer value are estimated by asking about WTA for each. For total value, the national voting method (double bound model) is used; for consumer value, the Gabor Granger method (payment card system), showing eight amounts (£5, £10, £15, £20, £30, £40, £50, £60) randomly, is used.
- Estimation model: calculated according to the random utility model
- Total value: £20.70/month
- Consumer value: £18.35/month
- Factors having an impact on WTP: Those are measured in terms of their correlation with items classified under various genres. For total value, results indicate a positive correlation with news, regional news, nature programs, current affairs programs, etc. For consumer value, there is a direct correlation with news, regional news, soap operas, hit movies and so on.

b. BBC 2006

The British government also carries out the same WTP survey when determining license fees, with the following results.²⁰⁾

- Period: 2005
- Survey target: 9,749 persons (random sample from 100,000 individuals recruited online, but excluding those not answering about WTP or not having paid license fees)

(1,741)

- Survey method: on-line survey
- Question method: bidding game. Price starts at £31 or more per month, with amounts of £31, £27, £23, £19, £15, £11, £7 and under £7 shown.
- Estimation method: random utility model
- Estimation result: The value of existing services + proposed future services was set at £162.72 yearly (standard group). The value of existing services + proposed future services was set at £162.60 yearly (public value group). The Logit model and other methods are used for estimation.

In this analysis, factors affecting WTP are estimated using Logit models, but there is a significant proportional relationship with the rating for the BBC's quality. Regarding the relationship with the five values set out by the BBC in its vision, *Building Public Value*, there was little difference among the items.

Ireland

Next, a WTP survey was conducted to verify the appropriateness of licensing fee amounts for the Irish public broadcaster RTE, to analyze what program genres and WTP have a correlation.²¹⁾

- Survey target: 807 persons aged 15 and over from the respective age, sex, address and social class segments.
- Period: Late November to early December, 2002
- Survey target: 1,000 persons
- Method: Telephone interviews
- Question format: Regarding price, open-ended answers. However, in the pre-test (360 samples), respondents were shown prices of €30, €60, €90, €120, €150, €180 and €210 and asked to choose between two items.

- Estimation result: median score €21.05 per month (household); average score €15 per month (household)
- Factors affecting WTP: Those are estimated using the method of generalized least squares, the Tobit model and the Logit model, and there is a correlation between WTP and satisfaction and viewing frequency. Comparison of quality with commercial broadcasters for certain genres also has a strong impact on WTP.

Canada

A WTP survey was also conducted in Canada, to assist in discussions when setting the amount of government subsidies for the Canadian Broadcasting Corporation (CBC).²²⁾ The characteristics of this analysis are that it treats usage value and non-usage value separately, and that the question formats use a combination of open-ended and double bound models.

- Period: Autumn 1998
- Survey target: 2,404 households throughout Canada (selected from telephone directories); response rate 39 percent. Respondents were divided into one group answering about usage value for their own use, and the other about usage value for other Canadians.
- Method: Placement method
- Question format: Regarding price, a combination of open-ended answers and double bound method when shown prices of C\$2, C\$7, C\$12 and C\$18.
- Estimation results: C\$5.76 per month (English-speaking households); C\$5.46 per month (French-speaking households)
- Factors affecting WTP: Those are estimated using the Logit model, and the figures show that sports, domestic news and Canadian drama have a strong impact on WTP, and that there is also a positive correlation between WTP and comedy, radio, regional

news, children's programs and so on.

As the above examples from the U.K. and others illustrate, varying respondent characteristics and question format show an attempt to grasp the effects and value of broadcasting from multiple viewpoints. Table 12 summarizes these results.²³⁾

Table 13 Comparison with other Studies

	Question method	MeanWTP	Factors affect WTP
Cost-Benefit Reserch Group (1977)	Open-end method (ask WTP to each program)	280 yen/day (all broadcasters)	Program variety, but not viewing hours
<i>Houso/shakai/keizai</i> Research Group (1991)	Open-end method (ask WTP to each program)	2,848.4/month (NHK)	viewing hours, joyfulness, income,
BBC/Human Capital (2004)	National voting (double bound)	£20.70/month (BBC)	News, local news, and nature
	Gabor/Granger (random)	£18.35/month (BBC)	News, local news, soap opera
Work Foundation (2006)	Bidding game	£168.12/year	Age, education, rating on quality of BBC
	Bidding game	£171.48/year	
CBC (2003), Canada	Double bound method	C\$5.78 (English family), C\$5.44 (French family)	Sport, domestic news, Canadian drama
RTE (2004), Ireland	Dichotomous choice method	€21.05/month	Characteristics such age, education, region, media environments, frequency of view

Source: Ichikawa [2007], appendix

5. CONCLUSION

This paper has two objectives: (i) derive the exact WTP of NHK as a public broadcasting; and (ii) factors affecting WTP. By the well-prepared question surveys, this paper can obtain the value of WTP, which is not so different from other researches. WTA is, however, failed to estimates due to problems related to questioning to reviewers, so that we have to revise questions on WTA. In addition, we have to examine

how robust the results we gained here are, and in so doing, we need to ask in other formats of survey. In this survey, we do not fully analyze important issues related to CVM such as (i) zero bids, (ii) outlier bids, (iii) household and individual WTP, and no more than the current license fee” bids mentioned by Delaney and O’Toole [2004: p.329]. In evaluation of environment, use and non-use values are accessed by CVM. In further survey, these issues will be challenged.

Regarding to the second object, the results we obtained by Logit models are not so different from other researches. The factors such as “age,” “viewing hours,” “income,” and regions are almost consistent with other models, especially those of Delaney and O’Toole [2004]. This paper can identify factors affecting to WTP in the framework to examine effectiveness and importance of NHK “Promises” and nineteen values of public broadcasting. These analyses can be utilized for setting up managerial strategy as a public broadcasting. In other words, this approach is referred to as “strategic” applications of CVM for identifying so-called “value-chain of public broadcasting” or long-term visions.

As mentioned earlier, environments of public broadcastings have been severer and severer, assessments by scientific methodology such as CVM becomes more important for them.

NOTES

- 1) Detailed discussions for public broadcasting accountability. See Nakamura [2007].
- 2) The aim of this paper is to analyze CVM on Japanese public broadcasting NHK, we do not describe the survey on this field. Ichikawa [2007] surveys widely attempts of CVM by different countries.
- 3) The Cost Benefit Research Group, headed by Prof. H. Onoe together with members of NHK, is said to have conducted the first WTP study, in 1975-76, on broadcasting involving massive fieldwork, with the aid of a grant from the NHK Broadcasting Culture Research Institute. Regarding Japanese studies, Ichikawa [2007] provides detailed cases and stories.
- 4) It is well-known, for example, that in the case of telephone surveys a selection bias is at work, because only those with telephones can be respondents. But as Arrow, et al. (1993) have demonstrated, some telephone surveys are more effective than personal interview surveys because they eliminate the influence of the interviewer.
- 5) Due to continuous improprieties occurring since 2004, NHK faced more than one million refusal of paying receiving fees. In order to restore viewers' confidence, new NHK management announced NHK "Promises" which consist of five and nine subsidiary items, and promised to achieve these goals. The contents NHK "Promises" is described in section 3.2, and also refer to Tsuji [2007].
- 6) See, for example, Miyahara et al. [2006], Miyahara et al. [2007], Tsuji et al. [2004] and Tsuji et al. [2006].
- 7) In terms of similarity with other countries, the analysis we carried out in this study most closely resembles the analysis of Ireland's RTE by Delaney and O'Toole [2004].
- 8) It is well-known that the initial value affects WTP and WTA, and thus amounts to be asked values upward and downward from 1,500 yen are different, see Table 2 and 3. For discussion on this, see Tsuji and Suzuki [2003].
- 9) See note 10 below.
- 10) Zero bids, outlier bids, non-responses cause serious problems in estimating WTP. In these tables, one in WTP and six in WTA replies are counted as "0 yen" WTP (WTA) after checking their replies to reasons for "0" yen. Many outlier bids in WTA failed to estimate it. Delaney and O'Toole [2004] takes good cares for these problems.
- 11) Detailed discussion is provided in NHK "Promises" Evaluation Committee [2006].
- 12) For AIC, see Greene [2000], for example.

- 13) See Ichikawa [2007] and Delaney and O'Toole [2004] in more detail.
- 14) No viewers do not oppose to these promises and subsidiary items. When many variables have equally large numbers, this kind of estimation cannot discriminate the variables, and this leads to small number of variables to be significant.
- 15) It is emphasized that high quality programs and transparent management are two wheel of restoring viewers' confidence to NHK. See Tsuji [2007].
- 16) See NHK "Promises" Evaluation Committee [2006] and Tsuji [2007].
- 17) One way to prevent this is to add a question to ask to select three most important questions.
- 18) BBC [2006] p. 87.
- 19) BBC [2004].
- 20) Work Foundation [2006].
- 21) Finn, McFadyen, and Hoskins [2003].
- 22) Delaney and O'Toole 2004.
- 23) This follows from Ichikawa [2007].

REFERENCENCES

- Arrow, K., R. Solow, P. R. Portney, E. E. Leamer, R. Radner, and H. Schuman [1993] Report of the NOAA Panel on Contingent Valuation.
- British Broadcasting Corporation [2006]. "Annual Report 2006", www.bbcgovernors.co.uk/annreport/index.html.
- British Broadcasting Corporation [2004] "Human Capital, Measuring the Value of the BBC".
- British Broadcasting Corporation [2006] "Building Public Value," 2006.
- Delaney, L. D. and F. O'Toole [2004] "Irish Public Service Broadcasting: A Contingent Valuation Analysis," *Economic and Social Review* Vol. 35, No.3, pp. 321-35.
- Finn A., McFadyen S., and Hoskins C. [2003] "Valuing the Canadian Broadcasting Corporation," *Journal of Cultural Economics* Vol. 27, No. 3-4, pp. 177-92.
- Foster, R., J. Eagan, and J. Simon [2004] "Measuring Public Service Broadcasting," in D. Tambini and J. Cowling, eds. *From Public Service Broadcasting to Public Service Communications*, Institute of Public Policy Research, 2004.
- Greene, W. H. [2000] *Econometric Analysis*. 4th edn. N.J.: Prentice-Hall.
- Ichikawa, Y. [2007] "On Measuring the Value of Public Broadcasting by CVM; A Survey," Discussion Paper No. 2, pp. 1-15, Graduate School of Applied Informatics, University of Hyogo.
- Miyahara, S., M. Tsuji, and F. Taoka [2006]. "An Economic Evaluation of Japanese Telemedicine," *Journal of Telemedicine and Telecare*, Vol. 12, suppl. 1, pp. 29-31.
- Miyahara, S., M. Tsuji, C. Iizuka, T. Hasegawa and F. Taoka [2007]. "On the Evaluation of Economic Benefits of Japanese Telemedicine and Factors for Its Promotion," *Journal of Telemedicine and e-Health*, Vol. 12, No. 6, pp. 691-9.
- Nakamura, Y. [2007] "The Accountability of Public Service Broadcaster: The Evolution of Public Commitment and Assessment," (in Japanese) *NHK Monthly Report on Broadcast Research*, August, pp. 56-67.
- NHK "Promises" Evaluation Committee [2006]. "Report of NHK 'Promises' Evaluation in 2005," (in Japanese). <http://www3.nhk.or.jp/pr/keiei/yakusoku/pdf/060627-001.pdf>

Ofcom. *The Ofcom Review of Public Service Broadcasting (PSB) Television*,
www.ofcom.org.uk/tv/psb_review/

Onoe, H. and Y. Sakamoto [1979]. "The Social Benefit of Television,"(in Japanese)
Studies of Broadcasting 15.

Tsuji, M. and W. Suzuki [2003] "The application of CVM for assessing the tele-health system: an analysis of the discrepancy between WTP and WTA based on survey data," (with Wataru Suzuki) in *Assets, Beliefs, and Equilibria in Economic Dynamics: Essays in Honor of Mordecai Kurz*, ed. by C. D. Aliprantis, K. Arrow, P. Hammond, F. Kubler, H.-M. Wu, N. Yannelis, pp. 493-506, Springer.

Tsuji, M. [2007] "Assessing Performance on NHK "Promises": Method and Approaches,
NHK Broadcast Studies, No. 5, 2006-2007, pp. 1-28.

Tsuji, M., W. Suzuki and F. Taoka [2004]. "Project Evaluation in the Field of Telemedicine," (in Japanese) in *Research on Policy Priority in an Aging Society: From the Common Viewpoints of Japan and the United States*, pp. 200-25, National Institute of Research Advancement.

Tsuji, M., F. Taoka, C. Iizuka, and M. Teshima [2006] "The Willingness of Japanese Citizens to Pay for e-Health Systems," *Journal on Information Technology in Healthcare*, Vol. 4, No. 2, pp. 103-110.

Work Foundation [2006] "Willingness to Pay for the BBC during the Next Charter Period," <http://www.theworkfoundation.com/products/publications/azpublications/willingnesstopaybbc.aspx>