

# Chapter 13

## Who Values the Media?

Scott J. Savage and Donald M. Waldman

### 13.1 Introduction

Media can be crucial for democracy. Because news and current affairs can promote political awareness and ideological diversity, many societies have charged policy makers with ensuring there are opportunities for different, new and independent viewpoints to be heard (“diversity”), and that media sources respond to the interests of their local communities (“localism”). In the U.S., the FCC traditionally limited the amount of common ownership of radio and television stations, and the amount of cross-ownership between newspapers, radio and television stations serving the same market. When ownership limits prevent share from concentrating around a few corporations, theory predicts that competition between many independent media sources can promote diversity of opinion, and incent owners to respond to their local communities.

More recently, legislators and the FCC have focused their attention on market forces, for example, consumer preferences and new media, such as satellite radio and television, the internet, and smartphones, in order to deliver their competitive, diversity and localism goals. The Telecommunications Act of 1996 (“Act”) relaxed the limit on the number of radio and television stations a firm could own nationwide, and permitted greater within-market common ownership by allowing a firm to own more local radio stations. The Act also required the FCC to review its ownership rules every four years to “determine whether any of such rules are necessary in the public interest as the result of competition.” Given the increase in choices through new media, supporters of greater ownership concentration argue that traditional media should be free to merge and use the efficiencies to provide more diverse and local programming. Opponents question whether such

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S. J. Savage (✉) · D. M. Waldman  
University of Colorado at Boulder, Boulder, CO, US  
e-mail: Scott.Savage@Colorado.EDU

D. M. Waldman  
e-mail: waldman@colorado.edu

efficiencies are achievable, and argue that consolidated media corporations are not flexible enough to serve the interests and needs of local and minority communities. Furthermore, many segments of the population do not have access to new media and even if they did, most of the original news on the internet, for example, is originated by newspapers, radio and television.<sup>1,2</sup>

Evaluation of these arguments requires, among other things, measurement of the societal benefits that arise from increased media diversity and localism. Policy makers may want to use the most recent estimates of demand to measure consumer satisfaction with their local media environment. Because they do not have identical preferences, they may also want to see how consumer valuations vary with age, education, gender, income, and race. The economic construct of willingness-to-pay (WTP) provides a theory-based, dollar measure of the value consumers place on their local media environment, as well as the amount they would be willing-to-pay for improvements in the individual features that comprise their environment. Since media environment is a mixture of private and public goods, indirect valuation methods, such as those used in the environmental and transportation choice literature, are appropriate.

This chapter uses data from a large nationally representative survey conducted during March, 2011 to estimate consumer demand for their local media environment, described by the offerings from newspapers, radio, television, the internet, and smartphone. Household data, obtained from choices in a real market and an experimental setting, are combined with a discrete-choice model to estimate the marginal WTP for improvements in four local media environment features. They are the: diversity of opinion in reporting information (*DIVERSITY OF OPINION*); amount of information on community news and events (*COMMUNITY NEWS*); coverage of multiculturalism, that is, ethnic, gender, and minority related issues (*MULTICULTURALISM*); and the amount of advertising (*ADVERTISING*). Consumer satisfaction with diversity in media markets is measured by their WTP for *DIVERSITY OF OPINION* and *MULTICULTURALISM*. Consumer satisfaction with local programming in media markets is measured by their WTP for *COMMUNITY NEWS*. The full cost of their media environment is measured by their monthly payments for media sources (*COST*) and the amount of advertising that comes with their media environment.

Results show that the average price for a media environment was about \$111 per month and the average consumer switching cost was about \$26 per month.

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<sup>1</sup> U.S. Census Bureau (2009) data show that 64 % of households had internet access at the end of 2009. Data from Pew Internet and American Life surveys show that about 78 % of adult Americans use the internet at May, 2010 (See <http://www.pewinternet.org/Static-Pages/Trend-Data/internet-Adoption.aspx>). About 24 % of the 234 million mobile phone subscribers owned a smartphone as of August, 2010 (ComScore 2011).

<sup>2</sup> During 2009, Pew Research Center (2010) monitored 53 Baltimore newspapers, radio and television stations, their associated web sites, as well as internet-only web sites. They found that traditional media accounted for 93 % of the original reporting or fresh information on six major news stories during the week of July 19–25.

Diversity of opinion and community news are important features of the local media environment. The representative consumer is willing-to-pay \$13 per month for more viewpoints in the reporting of news and current affairs, and \$14 per month for more information on community news. Consumers also value more information that reflects the interests of women and minorities, although the willingness-to-pay is relatively small at about two dollars per month. Consumers have a distaste for advertising and are willing-to-pay eight dollars per month for a decrease in the amount of space and/or time devoted to advertising in their overall media environment. WTP for diversity of opinion and community news increase with age, education and income, while WTP for multiculturalism decreases with age. Nonwhite respondents value the multiculturalism feature of their local media environment. Specifically, nonwhite males and females are willing-to-pay about \$3.50 and six dollars per month, respectively, for more information that reflects the interests of women and minorities.

We review the previous literature and then describe the experimental design, survey questionnaire and data. We next outline the random utility model of media environment choice, present demand estimates and calculate consumer valuations.

## 13.2 Review

Numerous studies in the social sciences examine new technologies and the consumption of news in media markets. Baum and Kendall (1999) present ratings data that showed the share of households who watched prime-time presidential television appearances declined from 48 % in 1969 to 30 % in 1998. Two explanations are offered for this trend: the rise of political disaffection; and the growth of cable television. Using National election study (NES) data, and controlling for demographics and political affection, Baum and Kendall estimate the effect of cable television on the individual's probability of viewing the 1996 presidential debate. They find that cable subscribers were less likely to have viewed the second debate and conclude that because they have more viewing choices, cable subscribers with an entertainment preference do not stay tuned to the President.

Because of the increased availability of entertainment, Prior (2002) argued that people with a preference for entertainment now consume less political information. He uses data from the NES and Pew Media Consumption Surveys from 1996 and 2000 to examine the relationship between cable television and the internet, and knowledge about congressional house incumbents. Using a logistic regression model that controls for demographics and political knowledge, Prior finds that among people who prefer entertainment, greater access to new media is associated with lower recall of house candidates' names and their voting record.

Using survey data from over 16,000 adults in the Washington, D.C. area between 2000 and 2003, Gentzkow (2007) estimated how the entry of online newspapers affected the welfare of consumers and newspaper firms. Estimates from a structural model of the newspaper market, comprised of *The Washington*

*Post*'s print and online versions and *The Washington Times*, suggest that the online and print versions of the *Post* are substitutes. The online newspaper reduced print readership by 27,000 per day at a cost of \$5.5 million in print profits. For consumers, the entry of the online newspaper generated a per-reader surplus of \$0.30 per day, equivalent to about \$45 million in annual consumer welfare.

Byerly et al. (2006) interviewed 196 subjects in the D.C. area during 2006 to investigate the consumption of news by minorities. They found that commercial television and newspapers were the most important sources of local news and information, while radio and the internet were among the least important. Subjects who identified the internet as a new media source indicated that it was a supplement to other traditional media, rather than a sole source of news. The most popular preferences for important media sources were "completeness of information" and "a stronger focus on local issues with a minority angle."

Nielson media research (NMR) and Pew Internet and American Life provide results from periodic surveys of households that provide a trend for studying preferences and new technologies in media markets. For example, NMR (2007) surveyed over 100,000 households during May and June, 2007 and found that new media, such as cable television and the internet, have made substantial inroads into traditional media's market share. Cable news channels were the most important household sources for breaking news, in-depth information on specific news and current affairs, and national news, while the internet was the second most important source. Broadcast television stations and local newspapers remain the most important sources of local news and current affairs.

Purcell (2011) provided survey results from 2,251 households that show that almost half of all American adults get at least some of their local news and information on their cellphone or tablet computer. These mobile local news consumers are relatively younger, have higher income, live in urban areas, and tend to be parents of minor children. One-quarter report having an "app" that helps them get information about their local community. Because local app users also indicate they are not necessarily more interested in general or local news than other adults, these findings suggest that the convenience of mobile news consumption, rather than quantity, is an important aspect of their preferences.

In summary, previous studies provide insights on consumer preferences for news and current affairs, and how demand is affected by technology change. Many of these studies, however, use attitudinal questions to describe general trends in news consumption and media use. Moreover, most were based on data prior to 2007 and typically measure outcomes for only one of the media sources that comprise the local media environment. This chapter uses the methodology described by Savage and Waldman (2008) and Rosston et al. (2010), and survey data obtained during March, 2011, to estimate consumer valuations for improvements in the diversity and localism features of their local media environment.

## 13.3 Data

### 13.3.1 Experimental Design

The WTP for local media environment features are estimated with data from an online survey questionnaire employing repeated discrete-choice experiments. The questionnaire begins with the cognitive buildup section that describes the respondent's local media environment in terms of the offerings from newspapers, radio, TV, the internet, and smartphone. Respondents are asked questions about their media sources, how much information they consume from each source, the cost of their media sources, and the quality of the four different features of their media environment described in Table 13.1.<sup>3</sup>

Cognitive buildup is followed by the choice experiments. Information from the cognitive buildup questions is used to summarize each respondent's actual "status quo" (SQ) media environment at home in terms of the media sources they use to get their information, the levels of the features of their environment: *DIVERSITY OF OPINION*, *COMMUNITY NEWS*, *MULTICULTURALISM* and *ADVERTISING* features, and their *COST*. A table summarizing the sources and features of the respondent's actual media environment at home is presented before the choice task.<sup>4</sup> The respondent is then instructed to answer the eight choice scenarios within the choice task. In each choice scenario, a pair of new media environment options, A and B, is presented. The two options provide information on news and current affairs from the same set of media sources indicated by the respondent during cognitive buildup, but differ by the levels of the features. Respondents indicate their preference for choice alternative A or B. A follow-up question is then presented that asks respondents to make an additional choice between their preferred alternative, A or B, and their actual SQ media environment at home. See Fig. 13.1 for a choice scenario example.

Market data is used from newspapers, radio and television stations, internet and mobile telephone service providers, a pilot study and focus groups to test and refine our descriptions of the features for choice alternatives A and B.<sup>5</sup> Measures developed by Huber and Zwerina (1996) were used to generate an efficient

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<sup>3</sup> Respondents were asked to consider what is available in their local media environment, rather than what they usually view or listen to. This represents a statement about the amount and quality of information programming being produced by media sources for their consumption.

<sup>4</sup> Contact the principal author for an example.

<sup>5</sup> The first focus group, with a hard-copy version of the survey, was held on December 9, 2010, in the Economics building at the University of Colorado at Boulder. Two men and two women, a local service employee and three staff members of the Economics Department, took the survey under supervision of the principal investigator and answered detailed questions regarding how they interpreted the questions and what they were thinking when they answered them. The second focus group, with an online survey, was facilitated by RRC Associates in Boulder on February 2, 2011. The group consisted of five diverse individuals with respect to age, gender, and internet experience, who completed the survey sequentially in the presence of a professional facilitator.

**Table 13.1** Media Environment Features

Characteristic	Description
<i>COST</i>	The total cost of monthly subscriptions to all of the household's media sources, plus any contributions to public radio or public TV stations.
<i>DIVERSITY OF OPINION</i>	The extent to which the information on news and current affairs in the household's overall media environment reflects different viewpoints. Low: only one viewpoint. Medium: a few different viewpoints. High: many different viewpoints.
<i>COMMUNITY NEWS</i>	The amount of information on community news and events in the household's overall media environment. Low: very little or no information on community news and events. Medium: some information on community news and events. High: much information on community news and events.
<i>MULTICULTURALISM</i>	The amount of information on news and current affairs in the household's overall media environment that reflects the interests of women and minorities. Low: very little or no information reflecting the interests of women and minorities. Medium: some information reflecting the interest of women and minorities. High: much information reflecting the interests of women and minorities.
<i>ADVERTISING</i>	The amount of space and/or time devoted to advertising in the household's overall media environment. Low: barely noticeable. Medium: noticeable but not annoying. High: annoying.

nonlinear optimal design for the levels of the features that comprise the media environment choice. A fractional factorial design created 72 paired descriptions of media environment, A and B, that were grouped into nine sets of eight choice questions. The nine choice sets were rebalanced to ensure that each household faced a range of costs that realistically portrayed the prices for media sources in their local media environment. For example, a respondent who indicated that they pay nothing for their local media environment was exposed to a range of costs that included zero dollars per month. Accordingly,  $COST_1$  ranged from \$0 to \$50 for households that indicated that the total cost of their actual media environment at home was less than or equal to \$30 per month.  $COST_2$  ranged from \$5 to \$100 for households that indicated that their total cost was greater than \$30 but less than or equal to \$70 per month.  $COST_3$  ranged from \$5 to \$150 for households that indicated that their total cost was greater than \$70 but less than or equal to \$120 per month.  $COST_4$  ranged from \$10 to \$200 for households that indicated that their total cost was greater than \$120 but less than or equal to \$180 per month.  $COST_5$

1. Consider the following two media environment options, A and B, which provide news and current affairs from *your* media sources: radio, television, and the internet. The two options differ by the levels of diversity of opinion, community news, multiculturalism, advertising, and by cost.

For this first question, we highlight the differences in the levels of the five features in red. For some of these five features, there may be no difference. Check the media environment option you would prefer.

[Click here to review a summary of the levels of all the features.](#)  
*To see the description of an individual feature, place your cursor over that feature*

	Option A	Option B
<a href="#">Diversity of opinion</a>	Low	Medium
<a href="#">Community news</a>	Medium	Low
<a href="#">Multiculturalism</a>	Low	Low
<a href="#">Advertising</a>	High	Medium
<a href="#">Cost</a>	\$25 per month	\$45 per month
	<i>Option A is less expensive and has more information on community news and events</i>	<i>Option B has less advertising and more diversity of opinion</i>
Select the option you prefer	<input type="radio"/> I prefer option A	<input checked="" type="radio"/> I prefer option B

2. Since you currently have a media environment at home, we also ask if you would actually switch to the media environment, B, you have chosen. Consider the features of your actual media environment. Would you switch to the option B you chose previously?

[Click here to review a summary of the levels of all the features.](#)  
*To see the description of an individual feature, place your cursor over that feature.*

	Your media environment	Option B
<a href="#">Diversity of opinion</a>	Medium	Medium
<a href="#">Community news</a>	Medium	Low
<a href="#">Multiculturalism</a>	Low	Low
<a href="#">Advertising</a>	High	Medium
<a href="#">Cost</a>	\$135 per month	\$45 per month
Select the option you prefer	<input type="radio"/> I prefer option A	<input checked="" type="radio"/> I prefer option B

Fig. 13.1 Choice scenario example

ranged from \$10 to \$250 for households indicating that their cost was greater than \$180 per month.<sup>6</sup>

The nine choice sets were randomly distributed across all respondents. Upon completion of their cognitive buildup questions, an online algorithm calculated each individual's total cost of their local media environment and assigned the appropriate cost range for the choices experiments, either  $COST_1$ ,  $COST_2$ ,  $COST_3$ ,  $COST_4$ , or  $COST_5$ . To account for order effects that could confound the analysis, the order of the eight A-B choices questions within each of the nine choice sets were also randomly assigned across all respondents.

Because some of the data are from choice experiments, we need to be concerned with hypothetical bias and survey fatigue. Hypothetical bias arises when the behavior of the respondent is different when making choices in a hypothetical market versus a real market. For example, if the respondent does not fully consider her budget constraint when making choices between hypothetical options A and B, WTP may be overestimated, because the cost parameter in the denominator of the WTP calculation (see Eq. 13.3 below) will be biased toward zero and the marginal utility (MU) parameter in the numerator will be biased away from zero. This bias is less of a concern in this study as opposed to studies that ask consumers to value environmental goods or advanced telecommunications services that are not provided in markets. Because most consumers have typically paid for some of their different media sources in actual markets, they should have a reasonable understanding of their preferences for their local media environment, and how their choices are constrained by their budget and time. Nevertheless, recent papers by Cummings and Taylor (1999), List (2001), Blumenschein et al. (2008) and Savage and Waldman (2008) have proposed methods for minimizing this source of bias. This chapter follows Savage and Waldman by employing a follow-up question that asks respondents to make an additional choice between their new choice, A or B, and their actual media environment at home. This additional nonhypothetical market information is then incorporated into the likelihood function that is used to estimate utility parameters.

Survey fatigue can arise from a lengthy questionnaire and make estimates from later scenarios differ from earlier scenarios. Carson et al. (1994) review a range of choice experiments and find that respondents are typically asked to evaluate eight choice scenarios. Savage and Waldman (2008) found there is some fatigue in answering eight choice scenarios when comparing online to mail respondents. To minimize survey fatigue in this study, the cognitive burden has been reduced by dividing the choice task into two sub groups of four choice scenarios. Here, the

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<sup>6</sup> The limit of \$250 per month is the total cost for a media environment with a seven-day subscription to a premium newspaper, such as the *San Francisco Chronicle* (\$25), a "All of XM" subscription to satellite radio (\$20), a premier subscription to cable or satellite television (\$110), a subscription to very-fast internet service (\$45), an unlimited data subscription for a smartphone (\$30), and \$10 monthly memberships to both NPR and PBS.



respondent is given a break from the overall choice task with an open-ended valuation question between the first and second set of four scenarios.<sup>7</sup>

### 13.4 Survey Administration

Knowledge Networks Inc. (KN) administered the household survey online. KN panel members are recruited through national random samples, almost entirely by postal mail. For incentive, panel members are rewarded with points for participating in surveys, which can be converted to cash or other rewards.<sup>8</sup> An advantage of using KN is that it obtains high completion rates and the majority of the sample data are collected in less than ten days. KN also provides demographic data for each respondent. Because these data are previously recorded, the length of the field survey is shortened to less than 20 min, which ensures higher quality responses from the respondents.

During the week of March 7, 2011, KN randomly contacted a gross sample of 8,621 panel members by email to inform them about the media environment survey. The survey was fielded from March 11 to March 21. A total of 5,548 respondents from all 50 states and the District of Columbia completed survey questionnaires for a response rate of 64.4 %. The net sample was trimmed by eliminating: 341 respondents with a completion time of less than six and one-half minutes; 46 respondents who skipped any questions in the choice task; 14 respondents who indicated that they pay \$500 or more per month for the media sources within their local media environment; eleven respondents who provided incomplete cost information; and five respondents who provided incomplete information on the features of their media environment.<sup>9</sup> The median completion time for our final sample of 5,131 respondents with complete information was about 16 and three-quarter minutes. The panel tenure in months for final sample

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<sup>7</sup> For a robustness check, the baseline estimates of utility in Table 13.4 below for the bivariate probit model were compared with estimates on the data for the hypothetical A-B choices only, as well as with estimates on the data for the first four and second four choice questions, and similar results were obtained.

<sup>8</sup> Unlike convenience panels that only include volunteers with internet access, KN panel recruitment uses dual sampling frames that includes both listed and unlisted telephone numbers, telephone and non-telephone households, and cellphone-only households, as well as households with and without internet access. If required, households are provided with a laptop computer and free internet access to complete surveys, but they do not participate in the incentive program. See Savage and Waldman (2011) for a detailed description of panel recruitment and non-response.

<sup>9</sup> The pilot study and focus groups indicated that the minimum time needed to complete the survey was about six or seven minutes. Because they may be shirking, the 341 respondents were removed in the survey with a completion time of less than six and one-half minutes. Evidence from KN suggests that this behavior is not specific to the survey style or content. The sample's distribution of interview duration in minutes is similar to other KN surveys with median completion times ranging from seven to 19 min.

respondents ranged from one to 136, with a mean of 41.18 and standard deviation of 31.33. See Dennis (2009) for a description of the panel survey sampling methodology.

Savage and Waldman (2011) present a selection of demographics for the U.S. population, for all KN's panel members, and for panel members who were invited to participate in this survey. The demographics for all KN panel members are similar to those reported by the United States Census Bureau (2009). Apart from race and employment status, the demographics for the gross sample of panel members invited to participate in this study and the final sample of respondents who completed questionnaires also are similar to those reported by the Census Bureau. However, estimates from the probit model that compares respondents' characteristics between the gross sample and the final sample also indicate potential differences in age, gender, education, and internet access between our final sample and the population. We remedy this possible source of bias in our results from step one and step two by estimating with weighted maximum likelihood. See Savage and Waldman (2011) for the probit model estimates and the procedures used to develop the poststratification weights.

### 13.5 Media Environment at Home

Table 13.2 presents summary statistics for respondent's media sources. Columns two and column three show that about 94 % of sample respondents watch television, about 81 % listen to the radio, and about 80 % use the internet. About 45 % of respondents read a paper or online newspaper regularly, and about 24 % of sample respondents own a smartphone. On average, television viewers spend about 1.9 h on a typical day watching television to get information on news and current affairs, radio listeners spend about 1.4 h listening to the radio to get information on news and current affairs, and internet users spend about one hour online (e.g., MSN, Yahoo, radio and TV station web sites, journalists' blogs) to get

**Table 13.2 Summary Statistics for Media Environment Sources**

Media source	Obs	Sample share (%)	Mean	s.d.	Min	Max
Newspaper	2,342	45.6	1.015	1.766	0	24
Radio	4,154	81.2	1.423	1.873	0	24
Satellite radio	558	10.9	1.522	2.221	0	24
Television	4,856	94.6	1.953	2.172	0	24
Cable television	2,736	53.4	1.976	2.210	0	24
Satellite television	1,381	27.0	2.071	2.197	0	24
OwnInternet	4,135	80.6	1.074	1.659	0	24
Smartphone	1,270	24.8	0.580	1.344	0	24

Obs is number of observations. Sample share is the percentage of the sample that uses the media source. s.d. is standard deviation. Min is minimum value. Max is maximum value. Own Internet is home internet service not provided by KN

**Table 13.3 Summary Statistics for Levels of Media Environment Features**

Feature	Obs	Mean	s.d.	Min	Max
DIVERSITY OF OPINION	5,131	2.09	0.655	1	3
COMMUNITY NEWS	5,131	1.99	0.711	1	3
MULTICULTURALISM	5,131	1.83	0.705	1	3
ADVERTISING	5,131	2.29	0.682	1	3
COST (\$ per month)	5,131	111.2	76.03	0	447
CONTRIBUTION (\$ annual)	535	111.5	161.5	0.25	1,500
BUNDLE	3,688	0.576	0.494	0	1

1 = “low”, 2 = “medium” and 3 = “high” for DIVERSITY OF OPINION, COMMUNITY NEWS, MULTICULTURALISM, and ADVERTISING. CONTRIBUTION is value of contributions to public radio and public television stations during the past 12 months. BUNDLE = 1 when subscription television service is bundled with internet service and/or other telephone services. Obs is number of observations. s.d. is standard deviation. Min is minimum value. Max is maximum value

information on news and current affairs. Newspaper readers also spend about an hour a day reading the newspaper, while smartphone owners use their phone to go online for about 0.6 h to get information on news and current affairs online.<sup>10</sup>

Summary statistics for media environment features are presented in Table 13.3. These data indicate that, on average, the levels of the *DIVERSITY OF OPINION*, *COMMUNITY NEWS*, *MULTICULTURALISM* and *ADVERTISING* features were about “medium.” About 58 % of respondents indicated that they bundled their subscription television service with the internet and/or telephone service. The price (or, *COST*) for the typical media environment ranged from zero to \$447 per month, with an average of \$111.20 per month. About 10 % of the sample indicated that they have contributed to public radio stations and/or public TV stations during the past twelve months at an average of \$9.30 per month.

## 13.6 Econometric Model

### 13.6.1 Random Utility Model

The random utility model is used to estimate marginal utilities and calculate WTP. Survey respondents are assumed to maximize their household’s utility of the media environment option A or B conditional on all other consumption and time allocation decisions. A linear approximation to the household conditional utility ( $U$ ) function is:

<sup>10</sup> The most popular media combinations are radio, television and the internet, about 30 % of sample respondents, and newspaper, radio, television and the internet, about 26 % of sample respondents.

$$\begin{aligned}
 U^* = & \beta_1 \text{COST} + \beta_2 \text{DIVERSITY OF OPINION} + \beta_3 \text{COMMUNITY NEWS} \\
 & + \beta_4 \text{MULTICULTURALISM} + \beta_5 \text{ADVERTISING} + \varepsilon
 \end{aligned}
 \tag{13.1}$$

where  $\beta_1$  is the marginal disutility of *COST*,  $\beta_2$ ,  $\beta_3$  and  $\beta_4$  are the marginal utilities for *DIVERSITY OF OPINION*, *COMMUNITY NEWS* and *MULTICULTURALISM*;  $\beta_5$  is the marginal disutility of *ADVERTISING* and  $\varepsilon$  is a random disturbance.

The utility of each media environment  $U^*$  is not observed by the researcher. What is known is which option has the highest utility. For instance, when a respondent chooses the new media environment option *A* over *B* and then the SQ over *A*, it is assumed that  $U_A^* > U_B^*$  and  $U_{SQ}^* > U_A^*$ . For this kind of dichotomous choice data, a suitable method of estimation is maximum likelihood (i.e., a form of bivariate probit) where the probability of the outcome for each respondent-choice occasion is written as a function of the data and the parameters. For details on the econometric model, see Savage and Waldman (2011).

### 13.6.2 Willingness-to-Pay

The marginal utilities have the usual partial derivative interpretation; the change in utility, or, satisfaction, from a one-unit increase in the level of the feature. Given “more is better”, the a priori expectation for *DIVERSITY OF OPINION*, *COMMUNITY NEWS* and *MULTICULTURALISM* is  $\beta_2, \beta_3, \beta_4 > 0$ . For example, an estimate of  $\beta_2 = 0.2$  indicates that a one-unit improvement in *DIVERSITY OF OPINION*, measured by a discrete improvement from “Low = 1” to “Medium = 2”, increases utility by 0.2 for the representative household. A higher cost and a higher amount of advertising provide less satisfaction so  $\beta_1$ , and  $\beta_5 < 0$  are expected.

Since the estimates of MU, such as an increase in utility of 0.2 described above, do not have an understandable metric, it is necessary to convert these changes into dollars. This is done by employing the economic construct of WTP. For example, the WTP for a one unit increase in *DIVERSITY OF OPINION* (i.e., the discrete improvement from “Low” to “Medium”) is defined as how much more the local media environment would have to be priced to make the consumer just indifferent between the old (cheaper but with only one viewpoint) media environment and the new (more expensive but with a few different viewpoints) media environment:

$$\begin{aligned}
 & \beta_1 \text{COST} + \beta_2 \text{DIVERSITY OF OPINION} + \beta_3 \text{COMMUNITY NEWS} \\
 & + \beta_4 \text{MULTICULTURALISM} + \beta_5 \text{ADVERTISING} + \varepsilon \\
 = & \beta_1 (\text{COST} + \text{WTP}_D) + \beta_2 (\text{DIVERSITY OF OPINION} + 1) \tag{13.2} \\
 & + \beta_3 \text{COMMUNITY NEWS} \\
 & + \beta_4 \text{MULTICULTURALISM} + \beta_5 \text{ADVERTISING} + \varepsilon
 \end{aligned}$$

where  $WTP_D$  is the WTP for an improvement in *DIVERSITY OF OPINION*. Solving algebraically for  $WTP_D$  in Eq. 13.2 gives the required increase in cost to offset an increase of  $\beta_2$  in utility<sup>11</sup>:

$$WTP_D = -\beta_2/\beta_1 \quad (13.3)$$

For example, estimates of  $\beta_2 = 0.2$  and  $\beta_1 = -0.01$  indicate that the WTP for an improvement in diversity of opinion from “Low” to “Medium” is \$20 (=  $-0.2/0.01$ ).

This approach to estimating consumer valuations is used for all other features of the local media environment. The WTP for *COMMUNITY NEWS*, *MULTICULTURALISM* and *ADVERTISING* is the negative of the ratio of its MU to the marginal disutility of *COST*.

## 13.7 Results

The discrete-choice data described above are used to estimate a bivariate probit model of household utility from their local media environment. Since each pair of binary choices, A versus B, and A or B versus SQ, for each choice occasion represents information on preferences, the starting maximum sample size for econometric estimation is  $n = 5,031 \times 8 = 40,248$ . Because there are some demographic differences between our final sample and the population, the random utility model is estimated with weighted maximum likelihood, where the contribution to the log likelihood is the poststratification weight times the log of the bivariate probability for the individual choice occasion.

## 13.8 Baseline Results

Table 13.4 reports weighted maximum likelihood estimates of the baseline model of household utility. MU parameters, asymptotic t-statistics for the marginal utilities (t), WTP calculations (WTP) and standard errors for the WTP calculations (s.e.) are presented in columns two through five. The estimate of the ratio of the standard deviation of the errors in evaluating the hypothetical alternatives to the errors in the SQ alternative,  $\lambda = 1.49$ , is greater than one. Respondents appear to have more consistency in choice when comparing the new media environment options than when comparing a new option to their SQ alternative.

<sup>11</sup> The discrete-choice model actually estimates  $\beta_2/\sigma$  and  $\beta_1/\sigma$ , where  $\sigma$  is the scale parameter. The WTP calculation is not affected by the presence of the scale parameter because  $-(\beta_2/\sigma)/(\beta_1/\sigma) = -\beta_2/\beta_1$ .

**Table 13.4** Baseline Estimates of Utility

	MU	t	WTP	s.e.
DIVERSITY OF OPINION	0.160	44.83	\$13.06	\$1.35
COMMUNITY NEWS	0.171	50.45	\$13.95	\$1.35
MULTICULTURALISM	0.022	6.18	\$1.82	\$1.30
ADVERTISING COST	-0.100	23.37	\$8.18	\$1.33
CONSTANT	-0.012	129.7		
$\lambda$	0.319	35.21		
Likelihood	1.487	67.53		
Respondents	-1.092			
	5,131			

MU is estimate of marginal utility. t is t ratio for MU estimate. WTP is estimate of willingness to pay. s.e. is standard error of WTP estimate.  $\lambda$  is the estimate of the ratio of the standard deviation of the errors in evaluating the status quo alternative to the errors in evaluating the hypothetical alternatives. Likelihood is mean log likelihood

Because consumers may have heterogeneous preferences for unmeasured aspects of media environment alternatives, utility is estimated with a constant to capture differences in tastes between the SQ and new A and B media options. Holding all other features of the media environment constant, the difference in utility between the SQ and the new media environment option can be interpreted as the consumer's disutility from switching from the SQ to the new media environment. Dividing this difference by the marginal disutility of *COST* provides an estimate of the average consumer switching cost, here, about \$26 (= 0.319/0.012) per month. Another way of examining switching costs is by comparing them to respondent's annualized average monthly cost of their media environment, here \$1,334 (= 111.2  $\times$  12). The estimated switching cost is about 23 % of annual consumer expenditures on the media sources that comprise their media environment. For comparison, Shcherbakov (2007) estimated that switching costs comprise about 32 and 52 % of annual expenditures on cable and satellite television services, respectively.

The data fit the baseline model well as judged by the statistical significance of most parameter estimates. The marginal utility parameters for *DIVERSITY OF OPINION*, *COMMUNITY NEWS*, and *MULTICULTURALISM* are positive and are significant at the one percent level. The marginal utility parameters for *COST* and *ADVERTISING* are negative and statistically significant at the one percent level. The estimated signs for these media features imply that the representative consumer's relative utility increases when: the information on news and current affairs from different viewpoints is increased; the amount of information on community news and events is increased; the amount of information on news and current affairs reflecting the interests of women and minorities is increased; the amount of space and/or time devoted to advertising is decreased; and the dollar amount the household pays per month for their media environment is decreased.

*DIVERSITY OF OPINION* and *COMMUNITY NEWS* are important features of the local media environment. Consumers are willing-to-pay \$13.06 per month for different viewpoints in the reporting of news and current affairs and \$13.95 for more information on community news and events. Consumers also value *MULTICULTURALISM*, although the willingness-to-pay for this feature is less precisely estimated. The results show that consumers would be willing-to-pay an additional \$1.82 per month for more information that reflects the interests of women and minorities. As expected, consumers have a distaste for *ADVERTISING*. The representative consumer would be willing-to-pay \$8.18 per month for a marginal decrease in the amount of advertising they have to listen to or view.

### 13.9 Heterogeneous Preferences

Because they do not have identical preferences, it is possible that individual consumer's WTP for their media environment varies with observable demographics. For example, women and nonwhite households may have stronger preferences for *MULTICULTURALISM*, and, because of a higher opportunity cost of time, higher income households may have a stronger distaste for *ADVERTISING*. Differences in the marginal utility of all features to different households are estimated by estimating the random utility model on various subsamples of the data according to age, education, gender, income, and race. These estimates of the random utility model for demographic subsamples are available from Savage and Waldman (2011).

WTP for more information on community news and events increases with age, from \$8.96 to \$20.78 per month. WTP for more information that reflects the interests of women and minorities decreases with age, with the 60 years and over group placing no value on this particular feature. Younger consumers have less distaste for advertising. Respondents aged 18–44 years are willing-to-pay about five or six dollars per month for a decrease in the amount of advertising in their media environment, whereas respondents 45 years and over are willing-to-pay about nine or twelve dollars per month.

WTP for diversity of opinion, information on community news and events, and information that reflects the interests of women and minorities increases with years of education. Respondents with no college experience do not value information that reflects the interests of women and minorities. Moreover, they are willing-to-pay about four or six dollars per month for a decrease in the amount of advertising in their media environment compared with educated respondents who are willing-to-pay about nine or ten dollars per month.

Valuations for the diversity of opinion, information on community news and events, and (less) advertising all increase with income. Low-income respondents do not value information on news and current affairs that reflect the interests of women and minorities, however, middle- and high-income respondents are

willing-to-pay about \$1.50 to \$2.50 per month for more information that reflects the interests of women and minorities.

The WTP for the diversity of opinion, information on community on news and events and less advertising are similar across male and female respondents. However, while females are willing-to-pay about three dollars per month for information on news and current affairs that reflects the interests of women and minorities, males place no value on this type of information from their local media environment. White respondents are WTP more for diversity of opinion, information on community news and events, and less advertising than nonwhite households. White consumers do not value information on news and current affairs that reflect the interests of women and minorities. In contrast, nonwhite consumers are willing-to-pay about five dollars per month for more information that reflects the interests of women and minorities. This relationship is explored further by estimating the random utility model on subsamples of white versus nonwhite males and white versus nonwhite females. The results are similar in flavor to those reported for the male and female subsamples. Nonwhite males are willing-to-pay \$3.48 per month for more information that reflects the interests of women and minorities, white females are willing-to-pay \$1.52 per month, and nonwhite females are willing-to-pay \$6.16 per month.

### **13.10 Conclusions**

This study estimated consumer demand for their local media environment, described by the offerings from newspapers, radio, television, the internet, and smartphone. Results show that the average price for a media environment was about \$111 per month and the average consumer switching cost was about \$26 per month. The representative household is willing-to-pay \$13 per month for more different viewpoints in the reporting of information on news and current affairs, and \$14 per month for more information on community news and events. Consumers value more information that reflects the interests of women and minorities, although WTP for this is only about two dollars per month. Consumers have a distaste for advertising and are willing-to-pay eight dollars per month for a decrease in the amount of advertising in their media environment.

Two goals of U.S. media policy ensured that there are opportunities for different, new, and independent viewpoints to be heard (“diversity”) and that media sources respond to the interests of their local communities (“localism”). By estimating consumer valuations for their local media environment, this study sheds some demand-side light on these goals. An interesting empirical extension would be to link measures of media market structure to consumer valuations of diversity and localism. For example, demand estimates could be used to calculate the effects on expected consumer welfare from a merger of two television stations that results in quality differences in diversity and localism between the pre- and postmerger markets.



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