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5 **COMPARING TELEVISION NEWS ACQUISITION FROM THE GULF**  
6 **AND VALDEZ OIL SPILLS: SIMILARITIES AND DIFFERENCES**

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## Abstract

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23 The *Deepwater Horizon* well blow-out in 2010 in the U.S. Gulf of Mexico is a  
24 recent example of a major news and environmental event while the *Exxon Valdez*  
25 spill in 1989 is more distant with some similar characteristics. Previous work by  
26 the authors estimated the welfare loss from “passive use value” associated with  
27 gathering news. We replicate that approach here using similar Nielsen TV  
28 viewing data and find the characteristics of the story have a similar effect in both  
29 events but the key economic relationship to the price of time has changed. We  
30 discuss reasons for this finding, and suggestions for improvement.

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39       **1. Introduction**

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41           The top news story of 2010 was the Gulf Oil Disaster according to a poll  
42 of editors conducted by the Associated Press (1). Economists have sought an  
43 observable link between behavior and distant events to estimate the welfare  
44 impacts of distant events. The authors have previously analyzed the Exxon Valdez  
45 spill of 1989 and provided welfare loss estimates of that event as a result of  
46 television news gathering (2). The Gulf Spill, an even larger physical event closer  
47 to the population of the United States, provides a useful contrast to the earlier  
48 study and is important in its own right.

49           Polls at the time of the Gulf Spill indicated that people were consuming  
50 media coverage of the incident, yet remain of the opinion that they are less well  
51 off than they were for the spill. These are the conditions under which it can be  
52 shown that the private benefits of their media consumption are a lower bound for  
53 the economic loss that distant viewers suffer from the spill. In the ABC  
54 News/Washington Post Poll of July 7-11, 2010, 68% said they thought the spill  
55 was a “major disaster,” while 28% said it was a “serious problem.” Only 3% said  
56 it was “not too serious.”

57           The importance of television network news has been on the decline with  
58 the advent of new television channels and the internet. However, television news

59 is single largest source of news at home. Almost two-thirds of adults watch  
60 network news during a month (3).

61 This letter first summarizes the theory presented in Farrow and Larson (2)  
62 for estimation of news coverage and its welfare impacts. New results for the Gulf  
63 Spill are then compared and contrasted with the existing results for the Valdez  
64 spill, and the resulting implications are discussed.

65

## 66 **2 Theory**

67 Our focus is on an illegal event such that a social definition of a “bad”  
68 exists (4). Our bounding approach can be shown to be appropriate when (a) a  
69 person is made worse off by the incident, and (b) the person is not able to fully  
70 compensate via private actions for the original loss incurred.

71 The key context and theoretical results from Farrow and Larson (2) are  
72 summarized below. As our data are based on daily news broadcasts, we focus on  
73 the choice of watching. We first model the consumer as facing an overall time  
74 constraint, and a constraint on TV viewing time determined exogenously by the  
75 broadcaster. The consumer chooses labor supply or viewing time. We derived a  
76 “choice to view” equation for individual  $i$  as:

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$$78 \quad (1) \text{ Prob}(i \text{ viewing on day } d) = \text{Prob}\{ \varepsilon_{id} < -w_i / \sigma + (x_d \cdot \beta + z_d \cdot \alpha) / \sigma \}$$

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80 where  $w$  is the wage,  $x$  measures long-run viewer characteristics,  $z$  is the vector  
81 of story characteristics as pre-determined by the broadcaster,  $\beta$  and  $\alpha$  are vectors  
82 of parameters, and  $\sigma$  is the error normalization. A heteroskedastic version of this  
83 equation results from aggregation by viewing cohorts. The parameters of the  
84 indirect utility function,  $v$ , can be obtained from equation (1).

85 The observable linkage between news coverage and viewing behavior is  
86 the coefficient vector  $\hat{\alpha}$ . The structure of the model implies that the effect of an  
87 oil spill story is a constant shift in implicit price for the duration of the story. It  
88 yields estimates of the implicit price of a minute of the newscast with the oil spill  
89 story ( $v^1 : z_d \cdot \alpha \neq 0$ ) and without ( $v^0 : z_d \cdot \alpha = 0$ ), where superscripts indicate the  
90 with/without condition.

91 Further development of individual and social welfare measurement is in  
92 Farrow and Larson (2).

93

### 94 3. Data and Empirical Results

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96 Television news of the Valdez event began on March 24, 1989. The daily  
97 time spent on Valdez coverage are some of the data reported in the Vanderbilt  
98 Television News Archive (5). Valdez coverage by all three networks averaged  
99 4.4 minutes of an approximate ninety minutes of broadcast time on nights when

100 the story was covered, with total time devoted to the story ranging from ten  
 101 seconds to 19 minutes (2).

102 The Gulf event started with an explosion on April 20, 2010 and the  
 103 resulting deaths, industrial damage and oil spill were major stories until the well  
 104 was capped on July 15, 2010 although stories continued periodically throughout  
 105 2010. Table 1 reports data on television coverage. In contrast to 1989, the  
 106 internet was a likely new source of news information available to many, as well as  
 107 additional cable or television channels.

108

109 **Table 1: Coverage of the Gulf Spill by Major Broadcast networks<sup>1</sup>, 2010**

Network	_FREQ_	Days of Coverage	Coverage Time in Minutes			
			Total	Mean	Max	Min
ABC	wkday	84	379.50	4.52	15.67	0.33
CBS	wkday	91	461.67	5.07	18.33	0.17
CNN		87	1,578.00	18.14	41.67	1.17
FOX		96	1,360.90	14.18	37.17	3.33
NBC	wkday	98	547.50	5.59	16.83	0.33
ABC, CBS, NBC			1,388.67	15.18		
All Networks			121	4,327.57	35.77	107.83

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112 The second type of information available to us are Nielsen data based on  
 113 electronic monitoring of television sets in use (6). The Nielsen data used are  
 114 based on electronic monitoring of the program and viewers among a 4,000

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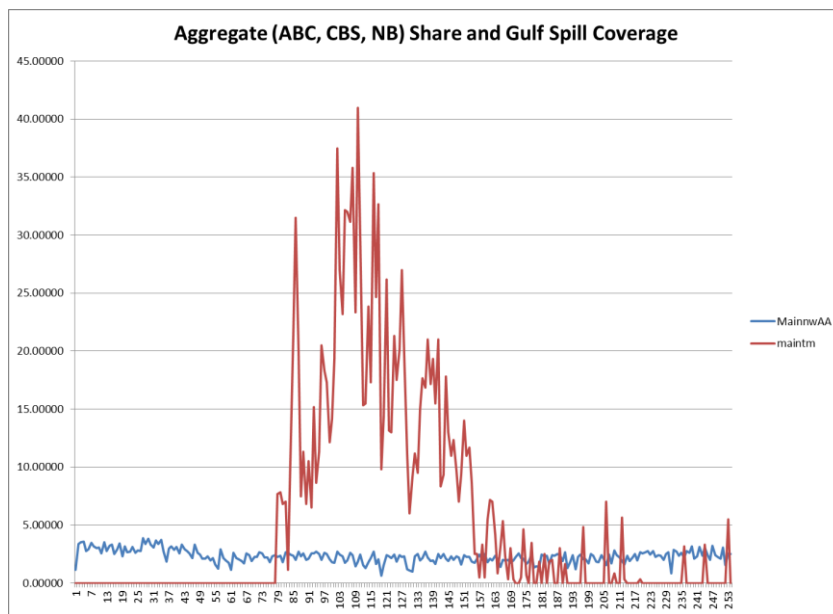
<sup>1</sup> Data collection on CNN and FOX is somewhat limited.

115 household representative sample in 1989 which had grown to about 37,000  
116 households in 2011 (7). Figure 1 charts aggregate time per day (in red) across the  
117 three weekday news programs devoted to coverage of the Gulf as well as the  
118 ratings share (in blue) of the aggregate. The large jump in coverage and its  
119 extended and periodic presence through the rest of the year is apparent.

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121 Figure 1: News Coverage of the Gulf Spill and Audience Share (6)

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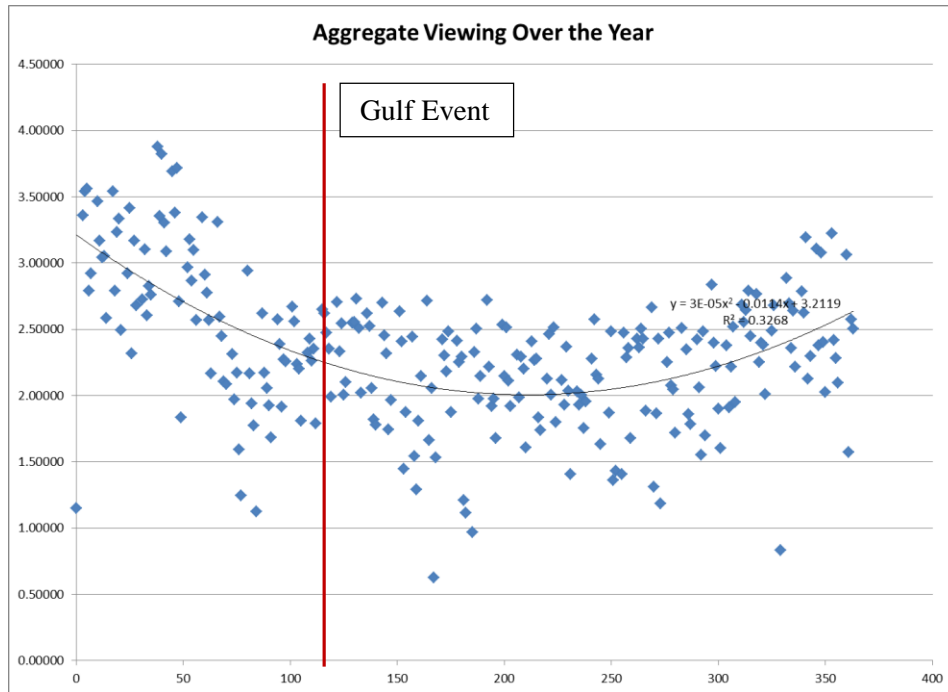
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126 A time trend is also apparent in the aggregate viewing percentage as  
127 shown in Figure 2.

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129 Figure 2: Aggregate proportion watching news by day of year, 2010

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133 Estimates are based on six major demographic categories defined by the  
134 viewing data: females 18-34, 35-49, and 50+, with parallel male categories. For  
135 2010, wage data are obtained Consumer Population Survey based on weekly  
136 earnings and hours of reported work (8).

137 The pattern of earnings differs across the two time periods. In 1989,  
138 females earned less than males in all categories and middle age workers earned  
139 the most. While females continued to earn less than males in the 2010 data, it is



140 the (working) oldest age bracket who earn the most. These estimates do not  
141 account for those unemployed or not in the labor force (9).

142

### 143 3.1 Estimation

144 Equation 1 was estimated for the two events. The model uses per-network  
145 share of audience as a function of each network's own nightly coverage of the  
146 incident as well as other variables.

147 The variables in the coverage vector  $z_d$  were based on the expectation that  
148 coverage of either spill would increase willingness to pay and viewership, with a  
149 possible decay effect. Results of probit estimation of the aggregate and individual  
150 network models are given in Table 2.

151 The Valdez variables for both coverage and the decay effect were  
152 significant in the decision to watch the news with signs as expected. The  
153 combined effect of these two variables is that the probability of viewing increased  
154 the most immediately after the spill with a fairly rapid decay. Also highly  
155 significant in the Valdez analysis were the mean wage rate and time trend  
156 variables. The trend variables indicate the temporal pattern of viewership, with  
157 lowest viewing probabilities in the summer months. Differential viewing patterns  
158 by age and gender occur with younger people watching less and older people and  
159 females watching more than middle-aged males, the omitted category.

160

161 **Table 2: Estimation Results for the Network News Viewing Models**

162 (t statistics in parentheses; \*\* significant at .01; \* sig. at .05)

	<b>Valdez Event</b>	<b>Gulf Event</b>
Constant	-1.28** (-72.0)	-2.609** (-28.39)
Elderly	0.055** (199.2)	0.533** (156.82)
Youth	-0.147** (-33.7)	-0.227** (-10.76)
Female	0.049** (10.3)	0.188** (13.03)
<b>Ln Event</b>	<b>0.005*</b> <b>(2.2)</b>	<b>0.005*</b> <b>(2.09)</b>
<b>Ln Decay</b>	<b>-0.003**</b> <b>(-4.2)</b>	<b>-0.001</b> <b>(-0.59)</b>
<b>Wage</b>	<b>-1.989**</b> <b>(-24.6)</b>	<b>1.760**</b> <b>(6.11)</b>
Day	-0.002** (-51.4)	-0.002** (-19.00)
Day <sup>2</sup>	5.09E-06** (50.3)	4.85E-06** (29.2)
<b>No. of Obs.</b>	4590	4408

163

164 The same specification applied to the Gulf event yields remarkably similar  
 165 results except for the sign of the wage variable. The young watch less and the  
 166 elderly and female more than middle-aged males. The difference among groups  
 167 increased from 1989 to 2010 based on the change in the coefficients and can be  
 168 observed in the basic data. The effect of broadcast time (Ln Event) is significant

169 and remarkably similar across the Valdez and Gulf events. The decay term  
170 becomes insignificant in the Gulf model although of similar magnitude. Strictly  
171 speaking, this indicates no decay in the effect of the broadcast time on the  
172 proportion viewing for the Gulf event. It remains possible that the decay effect is  
173 more complicated than is modeled here. The time trend variables are similar to  
174 those reported for the Valdez.

175         The major difference in the two events lies in the wage variable, which has  
176 the expected negative sign in the Valdez case and an unexpected positive sign in  
177 the Gulf case. This highlights a limitation of using highly aggregated data in  
178 estimation, where market prices are not available for all relevant factors affecting  
179 demand. In our model, we expect that the probability of viewing a news  
180 broadcast is affected by both income (positively) and opportunity cost  
181 (negatively), with the latter approximated by the viewer's opportunity cost of  
182 time.

183         However, wage is often not available independently in highly aggregated  
184 data sets. We chose to construct a wage variable from mean income and average  
185 labor market attributes. As a result, the wage coefficient is picking up both the  
186 price and income effects on viewing demand, and its positive sign likely means  
187 that the latter are greater in magnitude than the former. While we think this is the  
188 main driver of the unexpected sign on the wage variable, it may not be the only  
189 factor. The changes in the television viewing market noted earlier suggest

190 demographic differences for which there may be inadequate controls, such as  
191 age-based technological bias away from television for younger cohorts, and a  
192 wage effect of the recession which may have raised the relative wage of the  
193 elderly still working in contrast to that of the younger working population. As a  
194 result, demographic modeling of the Valdez event may have become more  
195 complex by the time of the Gulf event but further modeling is limited by data  
196 aggregation.

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## 198 **V. Conclusions**

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200           The acquisition of news can be the first link between an event and  
201 economic consequences for those who are distant from the event. Modeling the  
202 viewing choice and deriving the welfare implications are both possible. In a  
203 compare-and-contrast analysis of the Gulf oil spill relative to our earlier study of  
204 the Valdez event, similar patterns of event viewership were found, with broadly  
205 similar demographic effects that suggest some structural change in the television  
206 viewing market. The primary difference was in the effect of the wage variable,  
207 which had a statistically-significant positive sign, the opposite of what was  
208 expected and was found earlier. We believe this occurred because the aggregated  
209 data we draw on does not permit the model to distinguish properly between own-  
210 price and income effects on viewing demand and other possible structural changes

211 in the television viewing market. To resolve this, separate information on income  
212 and prices is needed.

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220 was involved with litigation in either the Valdez or Gulf oil spill cases.

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