

The Information Industry, Distant Use Value and the Exxon Valdez

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Outline

- Motivation: the Information industry and welfare measures
- Distant use value—Events
- Application: Valdez oil spill

The Information industry and welfare measures

- Information industry: “new” in 2002, 4.5% of GDP (formerly spread across 6, two digit industries)
 - publishing industries including software,
 - motion picture and sound recording industries,
 - broadcasting and telecommunications,
 - information and data processing services

Products and Welfare Measurement

- Products (Downs/Hamilton)
 - entertainment,
 - Input into
 - consumption decisions,
 - production activities,
 - and political actions
- Welfare measurement
 - Final good (e.g. entertainment)
 - Intermediate good
 - Value of information with uncertainty

Distant, non-use, passive use value

- Welfare: direct use is not a requirement to affect utility—various terms as above
- Shows up in many ways
 - Education, DOI
 - Entertainment setting
 - Locations of events (crime, oil spills, ..)

Welfare economics of information industry little studied

- Supply: public or quasi-public good; often large economies of scale
 - Supply side of media: Wildman, Owen, Beebe, Varian, Hamilton most focused on news
 - Supply of media programming: maximize profit by delivering audience sought by advertisers
- Demand: exists—usually more on direct use, e.g. WTP for cell phone use.

What happens when media are our main link to some events?

- Investigation in paper:
 - Can be many motivations for listening to news: entertainment, information, voting information....
 - For the case at hand, Valdez oil spill and much other news, if event is illegal then shift in demand due to event incurs opportunity costs that are a cost to society

Key steps

- Supply of news programming is exogenous to viewer
- Viewer may have various habits but adjusts behavior at the margin to maximize welfare
- Two aspects from essentially a referendum: an event can increase the probability of gathering news, increase the WTP for the news.
- Welfare measurement of quality changes with weak complementarity (Maler; Small & Rosen)
 - Welfare change is the change in the area of the appropriate demand curve,

Model outline

- Consumer's max utility subject to budget and time constraint--result, inverse Hicksian demand

$v_{id}(x_d, z_d, u)$ is the implicit value of news

Parameterized as

$$v_{id}(x_d, z_d, \varepsilon_{id}) = x_d \beta + z_d \alpha + \sigma \varepsilon_{id}$$

Where X are viewing patterns and attributes

Z are story characteristics (length, given spill)

Dichotomous choice

- Watch or not watch, assess if event changes demand
- $\text{Prob}(i \text{ viewing on day } d) =$
 $\text{Prob}(v_{id}(x_d, z_d, \varepsilon_{id}) > w_i)$

Dichotomous choice model; Aggregation by viewing class (age, gender) with adjustment for heteroskedasticity in viewing class j

Identification of scale parameter from restriction that wage coefficient is -1.

Welfare measurement

- Quality change with weak complementarity and discrete good (Small and Rosen)
- $wtp_{jd} = v_{jd} - w_j$,
- $\Delta WF_d = TM_d \cdot \sum_j \{E(wtp^1_{jd}) - E(wtp^0_{jd})\}$
- $= TM_d \cdot \sum_j \{ \text{Prob}[wtp^1_{jd} > 0] \cdot E[wtp^1_{jd} \mid wtp^1_{jd} > 0]$
• $\quad - \text{Prob}[wtp^0_{jd} > 0] \cdot E[wtp^0_{jd} \mid wtp^0_{jd} > 0] \}$.
- Adding and subtracting a common term,
- $\Delta WF = TM_d \cdot \sum_j \{ \text{Prob}^1[wtp^1_{jd} - wtp^0_{jd}] +$
 $\quad [\text{Prob}^1 - \text{Prob}^0] \cdot wtp^0_{jd} \}$

Data

- Nielsen ratings: 4,000 households per day
 - Only grouped data available for this project (micro data might be purchasable)
- Coverage of major events around 1989 (Vanderbilt television news archives)
- **Network News Broadcast Time**
 - 1984 Elections 80.5
 - TWA Flight 847 Hijacking/Hostage Incident 14.5
 - Grenada Invasion 12.0
 - Exxon Valdez Oil Spill (1989 only) 4.2
 - Bhopal industrial accident 2.0

Data

Coverage of the Exxon Valdez Incident By Major Broadcast Networks, 1989.

Network	Weekdays in Data Base	Days of Coverage	Total Time	Story Length (given coverage)		
				Mean	Minimum	Maximum
				----- minutes -----		
ABC	255	40	96.2	2.4	0.17	9.2
CBS	255	30	72.8	2.4	0.33	5.0
NBC	255	37	82.2	2.2	0.17	5.3
All Three Networks	255	57	251.2	4.4	0.17	19.3

Data

- **Potential Viewers and Opportunity Cost of Time, 1989**

	Gender			
	<u>Male</u>		<u>Female</u>	
<u>Age</u>	Viewers (<u>millions</u>)	Wage (<u>\$/min.</u>)	Viewers (<u>millions</u>)	Wage (<u>\$/min.</u>)
• 18-34	34.589	0.126	33.810	0.156
• 35-49	26.655	0.152	25.659	0.230
• 50+	33.539	0.135	27.218	0.207

Econometric results

(Preliminary)

	Individual Network Model	Aggregate Network Model
Constant.	-1.2798 (-72.0)	-0.63267 (-21.2)
Elderly	.054806 (199.2)	.071235 (139.5)
Youth	-0.14667 (-33.7)	-0.29213 (-39.0)
Female	0.04922 (10.3)	0.06697 (9.1)
Minutes	0.0054 (2.2)	0.00554 (2.0)
Factor	-0.00282 (-4.2)	-0.00460 (-3.5)
Wage	-1.989 (-24.6)	-1.6655 (-12.4)
Day	-0.00195 (-51.4)	-0.00284 (-38.8)
Day ²	0.50872E-05 (50.3)	0.73684E-05 (38.0)
Log-L	-1055.0	-690.2
Restr. Log -L	-1113.8	-760.1
Chi-Squared (df)	117.7 (8)	139.8 (8)
No. of Obsns.	4590	1530

Welfare estimates

(Preliminary)

	Individual Network Model	Aggregate Network Model
<i>Per Viewer Estimates</i>		
Prob ⁰	0.0621	0.1947
Prob ¹	0.0625	0.1956
wtp ⁰ (\$/minute)	0.2143	0.3301
wtp ¹ (\$/minute)	0.2146	0.3305
<i>Aggregate Estimates</i>		
Total 1989 Value	\$ 17.2 million	\$ 12.8 million
Total 2006 value	\$ 21 million	\$ 30 million

How to interpret?

- Dollar value of change from standard viewing pattern due to event
 - Profit max monopolist able to differentially price could extract this amount,
 - Given illegal nature of event, represents an opportunity cost to society of this event
- Full value of event for “distant use?”
 - More information outlets (if valued all inputs)
 - Integrate with later observed actions whose cost would include these information costs.

Distant Use Value and Water

- “Direct use values arise from direct interaction with water resources. They may be consumptive, such as use of water for irrigation or the harvesting of fish, or they may be non-consumptive such as recreational swimming, or the aesthetic value of enjoying a view.
- It is also possible that 'distant use' value can be derived through the media (e.g. television and magazines), although the extent to which this is attributable to a specific site, and the extent to which it is actually a use value, are unclear.”

Turner, Georgiu, Clark and Brouwer, 2004

Conclusions & Further Research

- We conclude that distant use value can be derived through the media such as television
- Further investigation worthy in areas such as:
 - Value of time in this activity (here impose wage)
 - Only change in viewing from baseline or in illegal cases is entire baseline the opportunity cost?
 - Alternative econometric estimation
 - Follow-on activities and a value of information approach