“Valuing the Priceless: How Much Are Health, the Environment, and Quality of Life Worth to Us?”

Glenn C. Blomquist

Faculty Research Symposium
Gatton College of Business and Economics
April 17, 2009
Economist!

- Areas: Health economics
  Environmental economics
  Urban and regional economics
  Public economics

- Known for: 1. Value of Mortality Risks
  2. Quality of Life
  3. Eliciting WTP without bias
Economics

- Efficient allocation of resources, choices
- Markets
- Worth? Price

- Worth if no market?
  - better health, greater safety
  - cleaner environment

- Challenge of Benefit Cost Analysis (BCA)
Benefit-Cost Analysis

- **Technique for systematically estimating efficiency impacts using economic models and statistics; balance**

- **Public policy:** Executive Order 12866
  - BCA of all major regulations
  - Office of Management and Budget, EOP
Economist

- Areas: Health economics
  Environmental economics
  Urban and regional economics
  Public economics

- Contributions: 1. Value of Mortality Risks
  2. Quality of Life
  3. Eliciting WTP without bias
Willingness to Pay (WTP): Worth

- Value to individuals, US!
- Value is our willingness to pay
- Demand curve gives marginal WTP
ESTIMATING WTP

- REAL, IMPLICIT MARKETS
  * Consumer product market (ABC)
    - Labor market
    - Housing market

- HYPOTHETICAL MARKETS
  - Contingent Valuation
  - Experiments
Mom, could you see if you have any gum in your purse? Now??

Jeremy, I'm driving seventy miles per hour in freeway traffic!

Do you think it would be worth it for me to let go of the steering wheel and dig through my purse so you can have a stick of gum??

Sugarless, no. Regular, maybe.
Tradeoff:

Value of expected change in utility from future consumption vs. Change in risk

Self-protection: Motorist use of safety equipment

JPE, EI, JTEP, REHO
Value of Changing Mortality Risks

Suppose:

- 8 of 10,000 people die from a risk each year
  Policy will reduce annual deaths to 7 of 10,000

- Value of saving 1 statistical (unknown) life? Or
  Value of risk reduction by 0.0001 or 1x10^-4

- $600 / 0.0001 = $6 million
Self-Protection and **Averting Behavior** in Consumption, Value of Statistical Lives, and Benefit-Cost Analysis of Environmental Policy

U.S. EPA Science Advisory Board
Environmental Economics Advisory Committee
May 13, 2004
Economist

- Areas: Health economics  
  Environmental economics  
  Urban and regional economics  
  Public economics

- Contributions:  
  1. Value of Mortality Risks  
  2. Quality of Life  
  3. Eliciting WTP without bias
ESTIMATING WTP

- REAL, IMPLICIT MARKETS
  - Consumer product market
  - *Labor market
  - *Housing market

- HYPOTHETICAL MARKETS
  - Contingent Valuation
  - Conjoint analysis
  - Experiments
Nice & Not-So-Nice Places

Basic idea:

Pay to live & work in nice places

Be paid to live & work in not-so-nice places

High QOL: Lower wages and/or higher housing prices

Low QOL: Higher wages and/or lower housing prices
Hedonic Analysis: Implicit Market for Amenities in Labor Market

- wage = f( worker & job characteristics)
  - include an amenity characteristic

- \( \frac{\partial W}{\partial A} = \frac{\partial \text{ money}}{\partial \text{ amenity}} \)

- Estimate multiple regression
  - education, experience, industry … amenity

- Coefficient on amenity → MWTP for amenity

- Similar regression for housing market
Full Implicit Amenity Price

\[ f_k = h_k \left( \frac{dp_k}{da_k} \right) - \frac{dw_k}{da_k} \] \hspace{1cm} (4)

- \( h_k \) quantity of housing purchased by a household in city \( k \)
- \( \frac{dp_k}{da_k} \) equilibrium housing price differential
- \( \frac{dw_k}{da_k} \) equilibrium wage differential
- combination of effect in housing market & effect in labor market
QOLI

- quality of life index (QOLI) for any city $k$

- $\text{QOLI}_k = \sum_i f_i a_{ki}$  \hspace{1cm} $k = 1, \ldots, N$. (5)

- QOLI sum of endowments of the $i$ amenities in city $k$ of $N$ cities

- Each amenity is weighted by its estimated full implicit price based on the wage and housing price differentials.
Value of Amenities

- Use markets for labor and housing
- Isolate the effects of local amenities on wages and prices
- Reveals what the amenities are worth to us
- AER for US and more recently JUE for Russia


QOL Rankings for US

- 253 urban counties in US, 1988 study
- BEST: Denver, CO; Sarasota, FL, Santa Barbara, CA, Lexington-Fayette (top 25)
- WORST: St. Louis City, MO; Wayne (Detroit), MI; Harris (Houston), TX
- Not *Places Rated Almanac*, *Money* Magazine
ESTIMATING WTP

- REAL, IMPLICIT MARKETS
  - Labor market
  - Housing market
  - Consumer product market

- HYPOTHETICAL MARKETS
  *Contingent Valuation
  Experiments
Ask Tradeoffs Directly

- Context for decision – hypothetical market
- **Description** of the “good”
- Institutional setting for providing the good
- **Payment** mechanism for the individual
- Elicitation method – how asked
- Debriefing questions
- Respondent characteristics - demographics
Willingness to Pay for Improving Fatality Risks and Asthma Symptoms: Values for Children and Adults of All Ages

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Vanderbilt Conference on the Heterogeneity of the Value of Statistical Life
March 26-27, 2009
CV: The Good, the Bad, & the Ugly

Good:
- Specify the policy change precisely
- Future technology can be evaluated
- Elicitation methods appear to be reliable
- Alternatives are imperfect

Bad:
- Scope and Embedding – Insensitivity
- Anchoring in elicitation
- Information and perception

Ugly:
- Hypothetical bias – yea saying
Hypothetical Bias

Will individuals who say “yes” they will pay in contingent valuation actually, really pay?
Getting Rid of Hypothetical Bias


Eliciting Willingness to Pay without Bias: Evidence from a Field Experiment

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Study Design – Health Good

Type-2 diabetes management program offered by trained pharmacist

- 3 appointments over 3 months for approximately 2 hours total time
- Measure blood pressure, hemoglobin A1c, weight
- Discuss symptoms, diet, exercise, and personal management
- Not part of insurance plans and not offered on market
Study Design - Sample

- Pharmacy patients who are diabetic
- Scientific study involving 20 minute interview at pharmacy
- Face-to-face, in-person interviews
- Paid $25
- May 1 – July 23, 2003 in Kentucky, USA
- Approximately 270 consumer/patients – 90 in each of the 3 groups
Study Design – 3 Groups

1. **REAL** – actually offered the program & provided if purchased

2. **HYPOTHETICAL** – dichotomous choice contingent valuation*

3. **HYPOTHETICAL** – “Cheap Talk” before contingent valuation*

*CERTAINTY FOLLOW UP questions were asked of hypothetical groups
Study Design – cont.

- Compare real purchases with hypothetical purchases adjusted for certainty

- Prices: One price per individual. Vary among individuals. $15, $40, or $80

- Highly similar individuals in groups – 21 Household, Health, and Socioeconomic characteristics. 2 significant differences
Real Group: Yes → Pay → Get Diabetes Management Program

“You are now being offered the opportunity to purchase the diabetes disease management service that was just described to you. All of the services that were described to you would be provided for one flat rate. If you choose to purchase the service, you will have to use some of your household income to pay for it here and now with cash, check or credit card.

Will you buy this service here and now at a price of $40? Please circle your answer below.”
Hypothetical Group

“Assume that you are being offered the opportunity to purchase the diabetes disease management service that was just described to you. All of the services that were described to you would be provided for one flat rate. Assume that if you choose to purchase the service, you would have to use some of your household income to pay here and now with cash, check or credit card.

Would you buy this service here and now at a price of $40? Please circle your answer below.”
FOLLOW-UP CERTAINTY

“If you answered YES, are you “probably sure” or “definitely sure” that you would buy the diabetes management service here and now at a price of $40? Please circle your answer below.”

“If you answered NO, are you “probably sure” or “definitely sure” that you would not buy the diabetes management service here and now at a price of $40? Please circle your answer below.”

- Who is really willing to pay the $40?
- Among those who say they intend to buy, can we identify and separate out those who will really buy?
- Preview: Only the individuals who answer YES and “definitely sure”
Table 1. Percentage of YES Responses – *Real* Purchases

<table>
<thead>
<tr>
<th>Price</th>
<th>Real group</th>
</tr>
</thead>
<tbody>
<tr>
<td>$15</td>
<td>45%</td>
</tr>
<tr>
<td>$40</td>
<td>23%</td>
</tr>
<tr>
<td>$80</td>
<td>10%</td>
</tr>
<tr>
<td>All</td>
<td>26%</td>
</tr>
</tbody>
</table>

Downward-sloping demand curve
Table 2. Percentage of Yes Responses: Real Purchases vs. All Hypothetical

<table>
<thead>
<tr>
<th>Price</th>
<th>Real group %</th>
<th>Hypothetical group: All yes responses %</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>$15</td>
<td>45</td>
<td>71</td>
<td>0.040</td>
</tr>
<tr>
<td>$40</td>
<td>23</td>
<td>41</td>
<td>0.129</td>
</tr>
<tr>
<td>$80</td>
<td>10</td>
<td>19</td>
<td>0.301</td>
</tr>
<tr>
<td>All</td>
<td>26</td>
<td>45</td>
<td>0.006</td>
</tr>
</tbody>
</table>

*Contingency table Pearson Chi-square test

**Hypothetical Bias:** Real 26% < Hypothetical All 45%
Table 3. Percentage of Yes Responses:
Real vs. Hypothetical-All vs. Hypothetical-Definitely Sure

<table>
<thead>
<tr>
<th>Price</th>
<th>Real group</th>
<th>Hypothetical group: All yes responses</th>
<th>Hypothetical group: Definitely sure yes responses only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>p-value*</td>
</tr>
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<td></td>
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<td></td>
<td>24</td>
</tr>
</tbody>
</table>

*p-value of the difference compared to the yes responses in the real group.

**No statistically significant difference:**
Real 26% and Definitely Sure Yes Hypothetical 24%
Figure 2. Parametric demand curves
Estimating the Social Value of Higher Education: Willingness to Pay for Community and Technical Colleges

Glenn C. Blomquist
Paul A. Coomes
Christopher Jepsen
Brandon Koford
Kenneth R. Troske
Graduate Students

- **Brandon Koford** “Essays in Eliciting Values of Public Goods: Mitigating Hypothetical Bias and Private Willingness to Pay in the Context of Public Budget Choices”

- **Ryan Phelps** “An Investigation into the Causes and Effects of 100% Smoking Bans in Restaurants and Bars”

- **John Perry** “The Impact of the Rise of Mid-level Practitioners”


- **Patricia Ryan** “The Demand for Reducing Heart Attacks: An Estimation of the Willingness to Pay for the Detection and Treatment of Vulnerable Plaque.”
- **Lisa A. Cave** “Environmental Kuznets Curves and Pollution Havens: A Study of Environmental Regulation, Trade, and Development”
- **Arun K. Srinivasan** “Value of Eco-labels and Consumer Demand for Paper Products.”
- **Michael R. Gumpper** "Consumer Response to Environmental Labeling."
- **Sandra C. Gray** "A Micro-Approach to Economic Cooperation among Nations: The Banking Industry's Basle Accord"
- **Michael A. Newsome** "Valuing the Benefits of International Ecotourism: The Case of Ecuador."

D. Scott Bellamy "Individual and Firm Demand for Health and Wellness Programs."

Richard M. O'Conor "Consumer/Patient Valuation of Drug Safety and Efficacy."

Gary W. Keener "Government Regulation of the Household Production Function: A Study of Prenatal Health Care."

Maury Granger "Evaluating the Influence of County Level Amenities on the Location of Manufacturing Establishments."

Uchenna N. Akpom "Structural Characteristics, Hedonic Price Indexes, and Cost of Urban Residential Building in Nigeria."

Timothy J. Stanton "Distributional Considerations and Consequences of the Clean Air Act."

Darrell E. Glenn "Choice Among Discrete Health Insurance Alternatives."

Werner Waldner "International Intraindustry Trade and Environmental Policy: The Impact of U.S. Emission Standards on Importation of German Cars to the U.S."
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