

**“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

# Tradeoff



## ZITS



©2006 ZITS Partnership. Distributed by King Features Syndicate



Jan. 2006



# 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  $1 \times 10^{-4}$
- $\$600 / 0.0001 = \$6 \text{ million}$

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
- $\partial W / \partial A = \partial \text{money} / \partial \text{amenity}$
- Estimate multiple regression  
education, experience, industry ... **amenity**
- Coefficient on amenity  $\rightarrow$  MWTP for amenity
- Similar regression for housing market

# Full Implicit Amenity Price

$$\blacksquare f_k = h_k (dp_k/da_k) - dw_k/da_k \quad (4)$$

- $h_k$  quantity of housing purchased by a household in city  $k$
- $(dp_k/da_k)$  equilibrium housing price differential
- $(dw_k/da_k)$  equilibrium wage differential
- combination of effect in housing market & effect in labor market



# QOLI

- quality of life index (QOLI) for any city  $k$
- $$\text{QOLI}_k = \sum_i f_i a_{ki} \quad k = 1, \dots, N. \quad (5)$$
- 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

- Blomquist, Glenn C., Mark C. Berger, and John P. Hoehn "New Estimates of Quality of Life in Urban Areas" *American Economic Review* (1988)
- Blomquist, Glenn C. "Quality of Life" in *A Companion to Urban Economics* edited by R. Arnott and D. McMillen (Malden, MA: Blackwell Publishing, 2006.)
- Berger, Mark C., Glenn C. Blomquist, and Klara Sabirianova Peter "Compensating Differentials in Emerging Labor and Housing Markets: Estimates of Quality of Life in Russia" *Journal of Urban Economics* (2008)

# 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

**Glenn C. Blomquist**

Department of Economics and Martin School of Public Policy and Administration,  
University of Kentucky

**Mark Dickie**

Department of Economics  
University of Central Florida

**Richard M. O'Connor**

Independent Consultant, Cincinnati, OH

**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

- Blumenschein, K., Johannesson, M., Blomquist, G.C., Liljas, B. and O'Connor R.M. “Experimental Results on Expressed Certainty and Hypothetical Bias in Contingent Valuation”  
*Southern Economic Journal* (July 1998)
- **Blumenschein, K., Blomquist G., Johannesson, M., Horn N., and Freeman, P.**  
**“Eliciting Willingness to Pay without Bias: Evidence from a Field Experiment”**  
*Economic Journal* (January 2008)

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

**Karen Blumenschein**

College of Pharmacy and Martin School of Public Policy and Administration,  
University of Kentucky, Lexington, KY, USA

**Glenn C. Blomquist**

Department of Economics and Martin School of Public Policy and Administration, University of Kentucky,  
Lexington, KY 40506-0034, USA; e-mail: gcbloom@uky.edu

**Magnus Johannesson**

Department of Economics, Stockholm School of Economics, Box 6501, SE-113 83 Stockholm, Sweden

and

**Nancy Horn**

American Pharmacy Services Corporation, Frankfort, KY, USA

**Patricia Freeman**

College of Pharmacy, University of Kentucky and American Pharmacy Services Corporation,  
Frankfort, KY, USA

# 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

Price	Real group
	%
\$15	45
\$40	23
\$80	10
All	26

**Downward-sloping demand curve**

## Table 2. Percentage of Yes Responses: Real Purchases vs. All Hypothetical

Price		Real group	Hypothetical group:	
		%	%	p-value*
\$15		45	71	0.040
\$40		23	41	0.129
\$80		10	19	0.301
All		<b>26</b>	<b>45</b>	0.006

\*Contingency table Pearson Chi-square test

**Hypothetical Bias: Real 26% < Hypothetical All 45%**

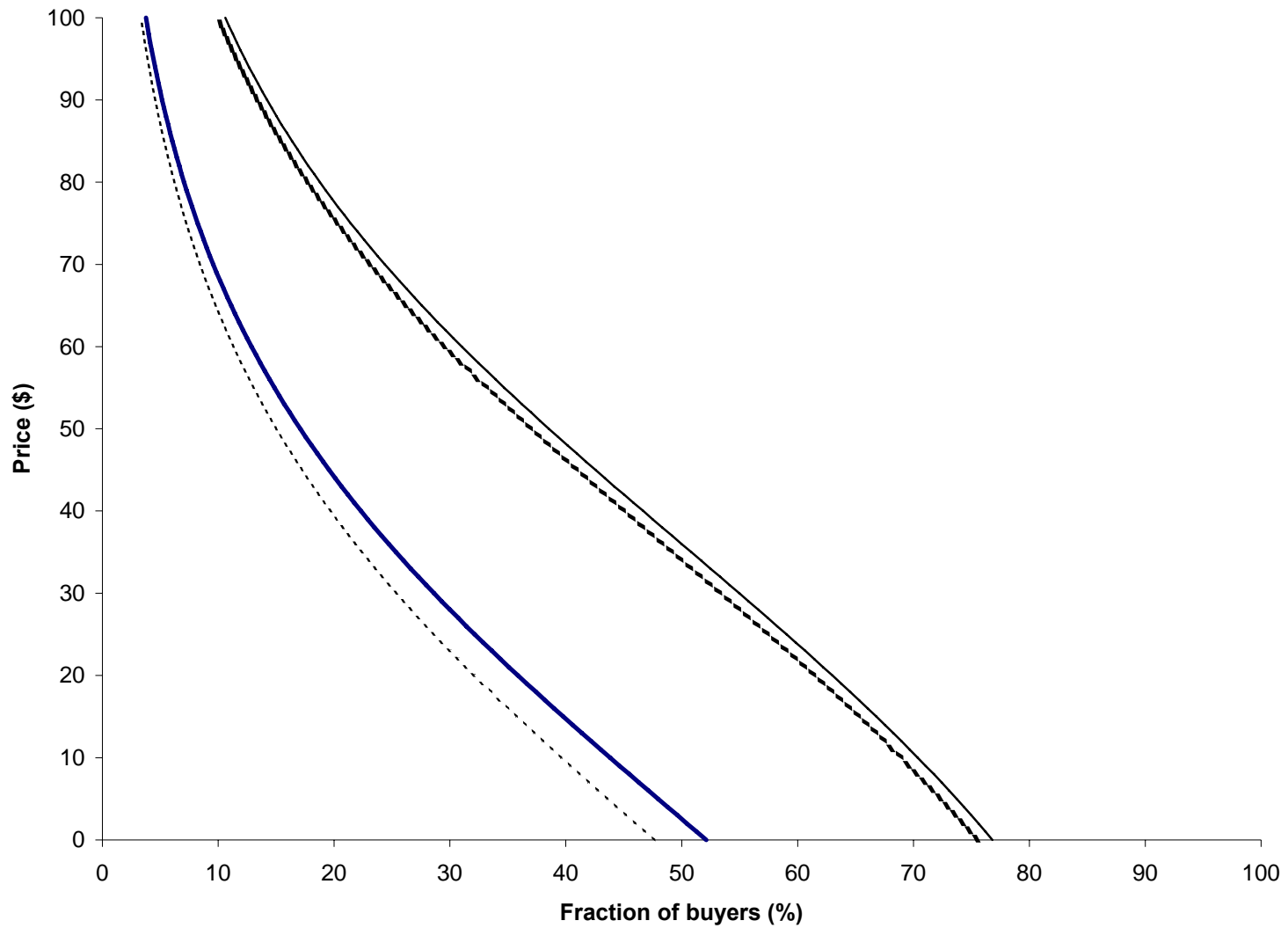
**Table 3. Percentage of Yes Responses:  
Real vs. Hypothetical-All vs. Hypothetical-Definitely Sure**

Price		Real group	Hypothetical group: All yes responses		Hypothetical group: <i>Definitely sure</i> yes responses only	
		%	%	p-value*	%	p-value*
\$15		45	71	0.040	35	0.460
\$40		23	41	0.129	32	0.423
\$80		10	19	0.301	0	0.103
All		<b>26</b>	45	0.006	<b>24</b>	0.830

\*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”
- **Rachel P. Lange** “An Economic Analysis of the Impact on Health and Health Care of Certain Medicare Provisions of the Balanced Budget Act of 1997”
- **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.”
- **Talina Rose Mathews** "Valuing the Disposal of Hazardous Materials with Increasing Risk: The Case of Aging Chemical Weapons."
- **Michael R. Gumpner** "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."

- **Jeff Anstine** "Economic Analysis of Curbside Recycling: Estimating the Demand for Recycling Services and Examining the Structure of the Material Recovery Facility Industry."
- **D. Scott Bellamy** "Individual and Firm Demand for Health and Wellness Programs."
- **Richard M. O'Connor** "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."

- **John C. Whitehead** "The Effect of Substitutes on Existence Value and Nature Preservation in Benefit-Cost Analysis."
- **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."

**“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