

Willingness to Pay for Early Warning Systems Using Contingent Valuation Method

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redefine THE POSSIBLE.



EWC III
Third International Conference
on Early Warning

From concept to action

27-29 March 2006
Bonn, Germany



Outline of this presentation



Introduction

- Why assessing willingness to pay for Early Warning Systems?

Methodology

- How can we assess willingness to pay for early warning systems?

Data and the Survey Instrument

- How was data collected?

Findings

- How much are they willing to pay?
- What factors are influencing their willingness to pay?

Conclusions



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Introduction: why assessing the willingness to pay for early warning systems?



- EWS as a new service
- EWS have huge positive externalities and non use values
- Policy makers need to know the social and monetary benefits of EWS
- EWS developers want to know potential market (price) for different EWS

Methodology: How can we assess willingness to pay for early warning systems?



1. Contingent valuation method (CVM) background

- Originally proposed by Ciriacy-Wantrup (1947)
- Davis (1963) used it first
- Considerable number of applications

2. Elicitation techniques

- Bidding game
- Payment card (PC)
- Open-ended (OE)
- Dichotomous choice
 - Single-bounded
 - Double-bounded

3. Problems and critics of contingent valuation method

- Validity ('accuracy) and reliability ('consistency) of CV studies
 - Disparity between WTP and WTA (willingness to accept)
 - Embedding or scope effect
 - Information effect
 - Elicitation effects



Methodology: How can we assess willingness to pay for early warning systems? A typical referendum CVM



Referendum CVM

In a typical referendum CVM question the respondent is asked whether or not she would vote in favor of a government program that would bring about a change in the provision of a given public good which involved a personal cost of t , in terms of increased taxes or expenditures.

The respondent will reply with a “Yes” only if her utility level in the presence of the proposed change and cost exceeds the utility level in its absence.

Data and the Survey Instrument: How was data collected?



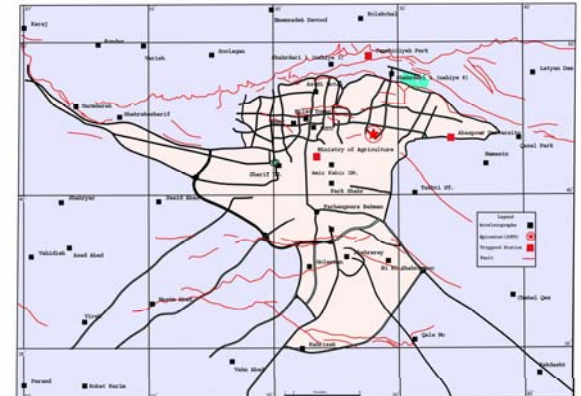
The Study Area

The CVM survey was conducted in Tehran, Iran which is located near major active faults and people have concerns about earthquake Risk. The head of households in the sample were randomly selected from different districts in Tehran.

The Survey Instrument

Questionnaire with 11 questions measuring

1. Age,
2. Income,
3. Education,
4. Marriage Status,
5. Number of Children,
6. Perceived risk of earthquake,
7. Fire Alarm at Home,
8. Previous Earthquake Damage experience,
9. City District,
10. Home Ownership,
11. WTP question



Data and the Survey Instrument: How was data collected?



Willingness to Pay (WTP) Question

Consider an early warning system that you can subscribe to by paying a monthly fee. This system can warn you two to three minutes before an earthquake happens. Are you willing to pay **X** Rials to subscribe to this service?

»Yes

»No

$X = 1, 5, 10, 15, 20, \dots, 100$

Findings: descriptive statistics



Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
P	250	1	100	50.48	32.263
AGE	250	16	70	40.18	11.646
ALARM	250	0	1	.07	.252
AREA	250	1	23	12.45	6.121
CHILD	250	0	8	2.12	1.912
EDUCATION	250	1	7	3.17	1.225
HOME	250	0	2	1.56	.652
INCOME	250	1	6	2.14	1.378
PROBABILITY	250	0	6	3.51	1.239
SINGLE	250	0	1	.86	.352
Valid N (listwise)	250				



Findings: How much are they willing to pay?

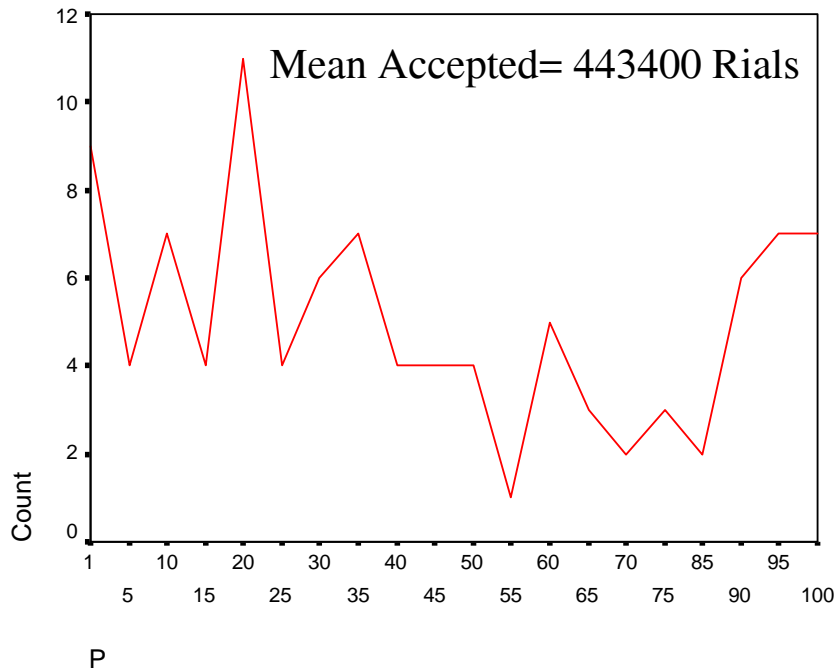


Fig. A: Accepted Bids

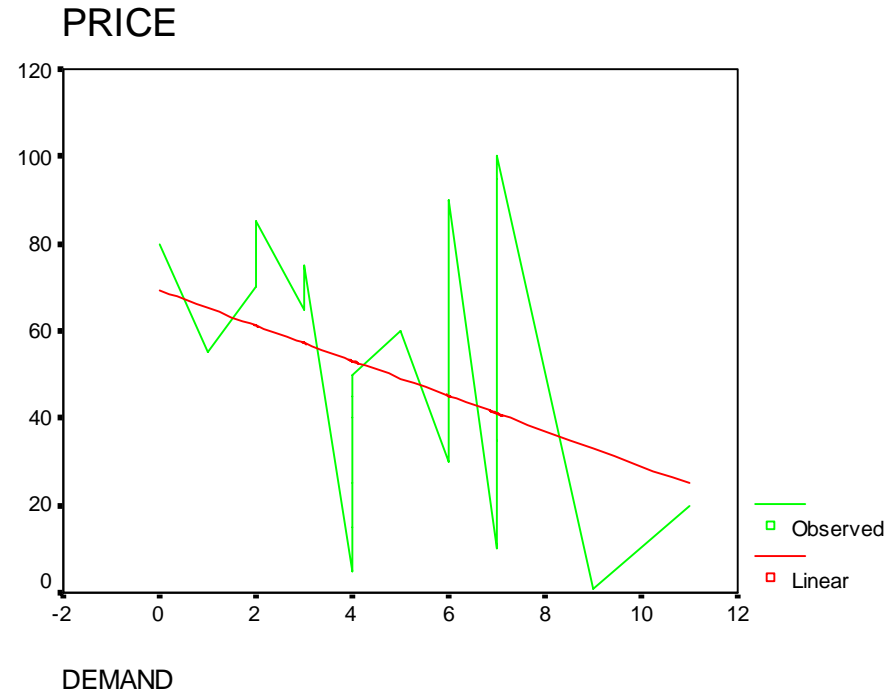


Fig. B: Linear Demand Curve

Findings: What factors are influencing their willingness to pay?



Dependent Variable: D1

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Constant	-3.590146	1.126225	-3.187770	0.0014
Bid (PRICE)	-0.010108	0.004398	-2.298280	0.0215
EDUCATION	0.301387	0.146108	2.062772	0.0391
FIRE ALARM AT HOME	1.172909	0.576921	2.033049	0.0420
PROBABILITY	0.306629	0.120992	2.534290	0.0113
HOME OWNERSHIP	0.392110	0.224853	1.743850	0.0812
CITY DISTRICT	0.078899	0.027733	2.845014	0.0044
MARIAGE	-0.470945	0.455652	-1.033562	0.3013
NO OF CHILDREN	-0.096109	0.108262	-0.887743	0.3747
AGE	0.012403	0.016878	0.734862	0.4624
INCOME	0.019131	0.113419	0.168673	0.8661
EARTHQUAKE DAMAGE EXPERIENCE	0.034753	0.930901	0.037333	0.9702 ¹⁰

Conclusions



- Economic aspects of EWS, especially people's willingness to pay, is an important element of an effective EWS policy.
- This experimental study with a relatively small sample size shows that:
 - There is a demand for EWS
 - CVM is a potential method for assessing the benefits of EWS
- More CVM studies are needed with larger samples with cross cultural focus.