

***Choice rationality in Stated  
Preference Methods:  
An Application To Farm Animal  
Welfare Improvements***

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Research Funded by DEFRA (Formerly MAFF) and DARDNI

# Stated Preference methods:

- Assumption of rational Choice

*"Rationality as a concept would seem to belong to the relationship between choices and preferences"*

(Sen, 1982, pg74)

## Classical Decision Theory:

Relationship = Utility Optimisation

# Axioms of Utility Theory required for Rationality:

- **Transitive Preferences**

*i.e. if A is preferred to B, B is preferred to C, then A must be preferred to C*

- **Monotonic Preferences**

*i.e. in a choice where one object dominates the other, an individual will always choose the dominant object*

- **Procedural Invariance**

*i.e. preferences for objects should be independent of the method of elicitation*

# Observed Violations of Utility Theory:

- **Transitivity:**

Tversky (1969)

- **Procedural Invariance:**

Lichtenstein and Slovic (1971)

Lindman (1971)

- (1) P-bet - high probability, low payoff
- (2) \$-bet - low probability, high payoff

Choice: "P-bet"

Pricing: "\$-bet"

# Can the Reversals be Explained?

1. Can it be explained through economic theory i.e. include monetary incentives?

- *Preference reversals shown to be robust*

2. Violations of utility axioms:

- *Transitivity*
- *Independence*
- *Procedural Invariance*

3. Contingent Weighting (Tversky, Sattath and Slovic, 1988)

- *Weight attached to attributes is contingent on elicitation method*  
*i.e. pay-offs more important in pricing decisions*  
*(compatibility principle)*

# Implications:

*Constructed Preferences - respondents use various "rules of thumb" in making decisions*

## *Contingent Valuation*

- Susceptibility to the framing of questions
- Observed: Irwin, Slovic and Lichtenstein (1993), Brown (1984)

*".....a CV survey becomes an active process of value construction, rather than a neutral process of value discovery"*

(Irwin, Slovic and Lichtenstein, 1993)

# **The case study:**

- **Four farm animal welfare improvement schemes**
- **Based in Northern Ireland**
- **Two elicitation methods:**
  - **Paired Comparisons**
  - **CVM**

# Farm Animal Welfare Improvement Schemes:

- **Laying Hens** *Changing from battery Cages to either free-range or barn system*
- **Dairy Cows** *Changing to straw yard housing from cubicle housing*
- **Pigs** *Increasing the space allowance and the addition of straw*
- **Chickens** *Use of slower growing chickens, extending their life-span from 43 days to 70-90 days*

# The Survey:

- **Northern Ireland**
- **Sample of 400**
- **Electoral Register**
- **3 stage random survey**
  - 1) Select Electoral Wards
  - 2) Select 2 clusters within wards
  - 3) Select individuals

# Two Elicitation Methods:

## Paired Comparisons

*All possible pairs of welfare improvement schemes are offered to respondents, who choose their preferred option of each pair*

- Produces a Ranking of the Schemes
- Reveals Transitivity

## Contingent Valuation

*Respondents state their Willingness-to-Pay (WTP) for each of the four welfare schemes*

- Produces a Ranking of the Schemes

# ***Contingent Valuation study:***

## **Description of the Good:**

- Based on FAWC – scientifically credible
- non-emotive description
- Extensively piloted tested

## **Payment Vehicle:**

- The levying of a food tax

## **Elicitation Format:**

- Double bounded dichotomous choice
- Four bid schemes were used (four starting values)
- Initial bid values where derived from a pilot study

# Results: The Method of Paired Comparisons

- Identification of Intransitive Respondents - 17%
- Logistic Regression (Bradley-Terry Model)

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Scheme	Position on Continuum
Laying Hens	0.7586 (0.0819)
Chickens	0.7921 (0.0816)
Dairy Cows	0.6334 (0.0813)
Pigs	0 (0)

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# Results: Contingent Valuation Method

- Double Bounded Dichotomous Choice CVM
- Estimates: non-negative mean, truncated at 10%
- 95% Confidence Intervals

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	<b>Individual Weekly WTP</b>
<b>Dairy Cows</b>	<b>£2.89</b> <b>(2.30-3.24)</b>
<b>Laying Hens</b>	<b>£2.95</b> <b>(2.36-3.31)</b>
<b>Chickens</b>	<b>£2.63</b> <b>(2.13-2.96)</b>
<b>Pigs</b>	<b>£2.10</b> <b>(1.62-2.36)</b>

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# Results: Testing for Rationality

- **Transitivity:** 83%
- **Order of Preferences:**

# Order of Welfare Schemes

*Assessing the Significant Differences Between Schemes*

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	<b>CVM</b>	<b>Paired Comparisons</b>
Laying Hens Vs Chickens	Accept	Accept
Laying Hens Vs Dairy Cows	Accept	Accept
Chickens Vs Dairy Cows	Accept	Accept
Laying Hens Vs Pigs	Reject ***	Reject ***
Chickens Vs Pigs	Reject ***	Reject ***
Dairy Cows Vs Pigs	Reject ***	Reject ***

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Null Hypothesis: no difference exists

10% confidence level, \*\*5% confidence level, \*\*\* 1% confidence level

# Results: Testing for Rationality

- **Transitivity:** 83%
- **Order of Preferences:**
  - 1) *Dairy Cows = Laying Hens = Chickens*
  - 2) *Pigs*
- **Procedural Invariance:** 98%

# Implications of the Study:

- *Respondents are rational with stable, well-formed preferences between the animal welfare programmes.*
- *Positive benefit of implementing farm animal welfare improvement schemes*
- *Lack of preference reversals verifies the use of these methods*