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The impossibility of an ideal metric for economic evaluation and how we should select one

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Paradigms : Rationalism vs Empiricism



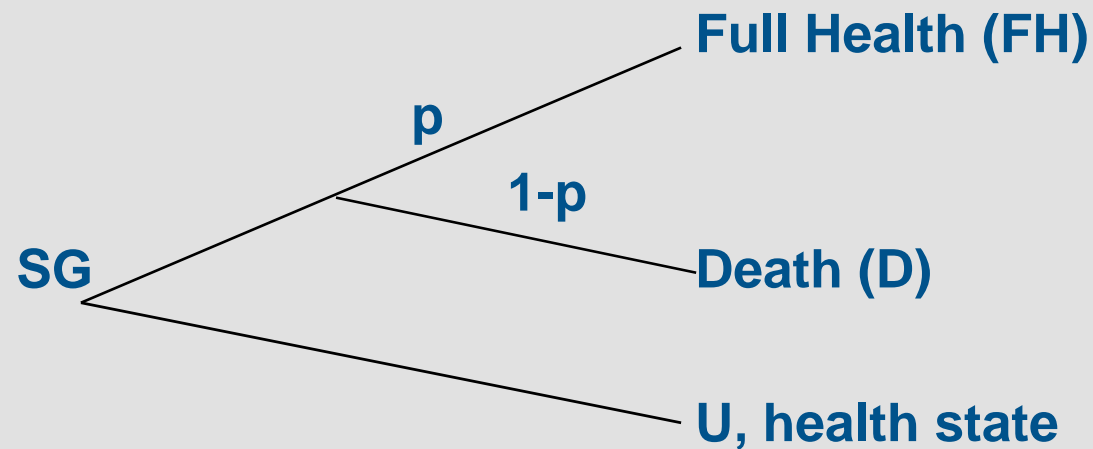
The Problem

Ideal Metric

- QALY (TTO, 1 Year)**
- HYE (SG x 2, Episode)**
- DALY (PTO, Judgement, Year)**
- WTP (Risk, Compensation)**
- WTP (Stated Preference)**
- SWTP (Stated Preference)**
- SWB**



2. Orthodox Theory : EU and Standard Gamble



EU Theory

$$\begin{aligned} E(U) &= p \times U(\text{FH}) + (1-p) U(\text{D}) \\ &= p \times 1 + (1-p)0 \\ &= p \end{aligned}$$

E U Theory : Empirical Evidence

Schoemaker 1983

Thaler 1992

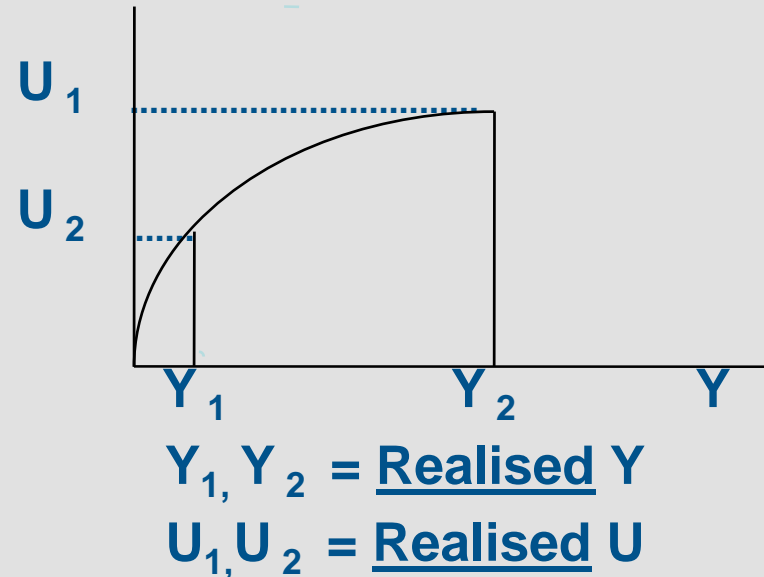
Kahneman ongoing

etc

etc

etc

E U: Theoretical Error



$E(U)$ = gamble, ex ante decisions

⇒ Specific (dis)utility of gamble per se: g

Advocates of $E(U)$ Some g irrespective of context

"World of under risk" = Twilight Zone/5th dimension



Stages of Knowledge Ahead

Temporal Staging of Uncertainty Risk : Pope

1. **Aware of uncertainty, Unaware of options** → **t₋₄**
 2. **Aware of 2+ options; choice unknown** → **t₋₃**
 3. **Choice made; outcome unknown (pre outcome)** → **t₋₂**
 4. **Outcomes Known; not experienced** → **t₋₁**
 5. **Outcome experienced; post outcome** → **t₋₀**
- 1- 4 ⇒ "Secondary Satisfaction"
- E(U) Theory : Stage 5 only**

Von Neuman, Morgenstein

I want to make it absolutely clear that I believe –as von Neumann did – that there may be a pleasure of gambling, of taking chances, a love of assuming risk, etc. But what we did say and what I do feel I have to repeat even today after so many efforts have been made by so many learned men, is that the matter is still very elusive. I know of no axiomatic system worth its name that specifically incorporates a specific pleasure or utility of gambling together with a general theory of utility... I am not saying that it is impossible to achieve it in a scientifically rigorous manner. I am only saying (as we did in 1944) that this is a very deep matter'

E(U): Escape Strategies

**(1) E(U) is normative
vs Keynes, Allais**

**i.e., "ignore dominating (ex ante)
emotions"**

**(2) Elaboration of Expected Outcomes
secondary satisfactions = outcomes
Empirically empty**

3. Impossibility of Ideal Metric

(a) Range of Options

Scaling	TTO, PTO, SG, RS, ME, WTP	6x
Time Frame	LY, episode, life	3x
Judge	patients, potential patients experts	3x
Perspective	ex ante, current, ex post	<u>3x</u>
		<u>=216</u>
Other	Capabilities (Sen)	[m x]
	SWB	[3 x]
	Other social goals	[n x]

(b) Winners Losers

Metric to measure Program Benefit	Group Favoured
Span of Unit	
Life	Elderly: low life expectancy. Each life counts equally
Life Year (LY)	Favours young: Long life
Life year gain	
Mean	Groups including individuals with a large gains(young), large effect upon mean; little on median. Disadvantages group including many individuals with small gains (elderly)
Median	Relative to mean: opposite pattern

(b) Winners & Losers (contd)

Quality of Life	
SG	With risk aversion, the equalising probability, p , increases Advantages life saving: disadvantages QoL
TTO	Unadjusted for discounting: downward bias in utility scores favour QoL improvement Adjusted: individuals with above average time preference have above average health state U scores: their preference for life saving is devalued; QoL exaggerated. Opposite for below average time preference
PTO	If equity important, favours option with larger numbers i.e. exaggerates utility of health states, favours life saving
WTP (a) stated (b) extrapolated risk	Favours high income earners, wealthy Advantages risk averse (higher inferred value of life)
Happiness scale	Disadvantages those seeking non hedonic goals
Capabilities	Advantages those unaware or untroubled by selected disadvantages perceived by others



(b) Winners & Losers (contd)

Composite Metrics	
HYE (SG)	Advantage to those advantaged by SG, LY
QALY (TTO)	Advantage to those advantaged by TTO, LY
DALY	Advantage to those advantaged by PTO, LY
HALY	(Happiness Adjusted Life Year). Advantage to those (genetically) capable of restoration to high level happiness and advantaged by LY

Handling Winners, Losers (1)

Compensation (Kaldor, Hicks)

1. Death disability

2. Purpose of NHS

- transfer
- **compensation = reverse transfer**

Treatment of Winners, Losers (2)

Agree upon Criteria (Samuelson, Bergson, SWF)

Not done to date

Unlikely as criteria \Rightarrow winners, losers

Logical Problem :

**Judge criteria to demonstrate (objective) superiority
("correct" choice)**

\Rightarrow meta criteria (i) universal result ...

(ii) institutionally relevant....

\Rightarrow meta meta criteria

Conclude: No "objective criteria exist"

Social (Political) Decision Making Unavoidable

(c) Social Decision Making and Arrows Impossibility Theorem (AIT)

Arrow's Methodology

"Axiomatic Approach to Choice Theory"

Unique, novel, revolutionary etc

(in geological time ...only 2500 years old)

(c) Social Decision Making and Arrows Impossibility Theorem (AIT) (cont)

Axioms of democratic legitimacy

1. Any individual may have any preference : must be possible to aggregate into well ordered preference function (i.e., transactive)
2. Unanimous preferences \Rightarrow social choice
3. (3a) a necessary (3b) sufficient to know included preferences to determine social preference
4. No dictator

Conclusion

No voting system fulfills 1 - 4

Example AIT: Condorcet (1785)

- **No voting system fulfills (1) – (4)**

$X > Y > Z$

$Y > Z > X$

$Z > X > Y$

By 2:1 majority $X > Y > Z > X$



Consequences AIT

**Cannot select ideal metric by
"democratic voting" : no "ideal" voting**

**End of road, in practice, for concept of
"objectively best"/"ideal"/"correct"/metric**

Arrow covers all extent voting systems

Theoretical solutions \Rightarrow practical choice

\Rightarrow choice of metric

Consequences AIT (contd)

Framework for Subsequent Analysis?

- Framework of AIT ... Axioms
- Alternative return to empiricism

Reason AIT - unsurprising
("paradox" ← abstraction)
- insights minimal

New paradigm needed (not rationalism)
(our suggestion builds on old, Samuelson/Bergson)

4. Which Framework for Analysis: Summary of Argument

AIT: ...unsurprising, common logic
... No insights for empirical world

Conclusion

...method ok for demolition ... No universal ideal
→ ditch (axiomatic) paradigm

Condorcet – Example 1

A: Religious Aesthetic: Church > Charity > PM McDonalds

B: Moral Atheist: Charity (Y) > PM McDonalds(Z) > Church (X)

C: Lazy Hedonist: PM McDonalds (Z) > Church (X) > Charity Work (Y)

Example 1

Choice and Effective Criteria

Church vs Charity \Rightarrow Church : Religious + Hedonist $>$ Atheist

Charity vs PM McDonalds \Rightarrow Charity : Religious + Atheist $>$ Hedonist

BUT

Church vs PM McDonalds \Rightarrow McDonald : Atheist + Hedonist $>$ Religious

Key: Criteria Change with coalition \Rightarrow one person disenfranchised

Example 2 : How Surprising Should AIT be – single person

Choice of Gluttony (G); Parsimony (P), Charity (C)

Recent Experience :

- **Seen Deprivation** $C > P > G$
- **Reviewed Superannuation** $P > G > C$
- **Run Good Luck** $G > C > P$

Example 2 (cont)

Effectively 3 people:

Seeks context free consistency (he is an economist)

\Rightarrow 1 vote/person \rightarrow C>P>G>C

**Individuals language: we vacillate/waver/dither/
change mind/chop and change
etc**

Society:

No vocabulary

Individual Intensity

May 1954 (Econometrica)

Partners

**Good Looks > Intelligence >
Wealth > Good Looks**

Hungry Rats

Food > sex > danger > food

Pilots

**Hot metal > flames > jumping >
hot metal**

Role of AIT

**Demonstrates no "ideal" exists;
no "correct" choice .. ok**

**Demonstrates no legitimate basis
for choice .. no**

Creates a normative ideal framework .. no

Role of AIT at Social Level

1. Empirical Simplification, Idealised framework ??

- identifies problem to be overcome ??

BUT

- no example of AIT in history
- assumptions wrong – wildly
- preferences not well ordered
(Goodin, Rice, George)
- don't vote for issues
follow parties
- parliament doesn't rank (options compared with \$)
- near dictatorship of cabinet
- legitimacy ← presentation, debate at elections
↔ transitivity



Role of AIT (2)

"Demonstrates no satisfactory Basis for Choice" (Normative not descriptive)

- **Empirically false : social choice occurs daily**
: accepted as legitimate
- **Legitimacy never challenged by AIT**
- **Why Axioms of AIT**
 - **alternatives available [eg must build on existing institutions]**
 - **selection AIT axioms**
 - ← **meta criteria** ← **meta meta criteria**

Summary

- **Search for Objectively "best metric"**
 - **Need for comparison of winners/losers**
 - **Need for social choice**
 - **Need objectivity best social choice**
 - **None exists (in practice, probably none in theory) AIT**

If 2+ criteria, voting → shifting effective criteria → inconsistency

i.e, No Best Metric

(also see Sen: Pareto Liberal)

- **Where to next (Framework)**
 - ⇒ **adopt method of AIT**
relativity sterile; makes logical point with respect to "ideal"/"objectively best" choice

5. Measurement Without Universal Validity

(Essentialism vs Nominalism)

Q. Is there "social choice" / "social improvement"

A. Yes: words designate class of problems (nominalism)

⇒ "essence" / objectively "correct" social choice (essentialism)

Q. How is social choice made

A. ← interaction; parliament, press, new ideas, interest groups etc
axiomatisation inappropriate ..loses dynamics..probably impossible

- legitimacy ← parliament = historical fact

← logic = fantasy of edifice builders

(b) Useful Measurement

Q. How do we know correct policy / metric

A. Don't : keep making suggestions

(1) Identifying possible Goals : Empirical Ethics

(2) Applying current goals

"Progress"

Options ⇒ Social Filtering with any method of government

Options ↑ ⇒ ↑Probability Improvement

"NATURAL SELECTION" within INTELLECTUAL MARKETPLACE

Macro Economics : Empiricism in Economics

Objectives ← **Social debate, emerging consensus,
then government fiat**

**= full employment, growth, inflation,
distribution etc.**

= ultimate goals

Changing Objectives

→ leisure, environment, SWB

Process = ideas, debate, parliament

**Metrics = valid reliable measurement
of goals**

Conclusion

Welfare Theoretic Basis for Evaluation including metrics

← rationalism : authority ← axioms (only)

← fundamental axioms unsustainable

← axioms of social choice

AIT demonstrates a failed paradigm/impossibility of "correct" metrics

Empiricism

- Proximate goals ← society (however governed)
- Empirical methods for informing goal selection
- metrics ← goals

Implications for Policy : General

Belief: goals, metrics "tied up"

→ **"Efficiency focussed analysis / policy"**

Goals Need Enquiry

→ **(NHS) Fairness focussed analysis policy**
(Richardson and McKie, 2007, JHE)

Implications for Economics

- 1. Stop imposing values on society**
- 2. Continue current evaluation methods**
 - theoretical basis, not methods = fault
 - changes = 2nd order
- 3. Empirical Ethics**
 - elicit goals, metrics. Fairness focussed analysis
- 4. Ditch Rationalism i.e., search for ultimate truths immutable edifices**