Models in economics: capacities v credible worlds

Philosophy of Economics
Michaelmas term 2014

Realism

- Economic models might be good for
  - Description
  - Prediction
  - ‘Understanding’
- Realism about X: Models should present accurate accounts of X in order to do their job.
- Why the fuss? Many economic models present descriptions that seem radically false of their targets.

Realism v Instrumentalism

- Instrumentalism – theories and models are just instruments for predicting. No need to describe anything else about the target situation correctly to be acceptable.
- Realism (about X)
  - Brand 1: Accurate description of X is a goal in itself. Instrumentalists give up on much of what matters.
  - Brand 2: Accurate description of X is a good way to get accurate prediction.

Cartwright and Sugden

- Both are realists of brand 2. Both present an account of how models (M) are useful for predictions about aspects of the target (T) if they get something – X – right about the target even if they get much wrong.
- Both are realists about something related to causes.

- Sugden 1: get the causes right to predict effects.
  (Causes in M = causes in T → effects in M = effects in T)
- Sugden 2: get the effects right to predict the causes.
  (Effects in M = effects in T → causes in M = causes in T)
- Cartwright: get right in M what the cause does when it acts without interference to predict its contribution in T

  but only so long as the cause has a stable capacity (which is confirmed outside M).

Cartwright

Causes in M are among causes in T
AND
causes in M have a capacity towards E
(supposing M is a Galilean model)
→
Effects in M = contribution to E in T

NC Capacities (Mill-type 'tendencies')

A cause has a capacity to x just in case:

there is a rule of combination such that for any situation in which the cause occurs the actual occurring effect can be calculated by using that rule to combine x with whatever would have happened otherwise.

Example: masses have the capacity to attract other masses with a force Gmm/r^2.

Rule of combination: vector addition of Gmm/r^2 with other forces present.

The central idea is **systematic contribution.** So rules of combination really matter.

Some rules of combination in economics (1)

- If q's contribution is represented by a function of q, various functions can combine q with other causes:
  - The simple consumption function is a linear function of autonomous consumption (c_o) and induced consumption ($c_1 Y^d$):

$$C = c_o + c_1 Y^d$$

[C = total consumption; c_1 = marginal propensity to consume; Y^d = disposable income (income after taxes and transfer payments)]

  - Induced consumption is a product of the marginal propensity to consume and disposable income.
- The theory assumes these quantities always contribute this way even if more causes are added, subtracted; i.e., it treats these as causes with capacities.
- NB: it is not this equation that shows these are treated as capacities, but how we change the equation.

Some rules of combination in economics(2):

- Where contributions are represented by an equation, the rule of combination = simultaneous satisfaction of all equations. (Simultaneous equation models)
- Simple example: the equations depicting the supply mechanism – the supply-side contribution to quantity – and the demand mechanism – the demand-side contribution to quantity – must be satisfied together:

$$Q_s = \alpha P + \mu \ (\alpha > 0) \quad Q_d = \beta P + \nu \ (\beta < 0)$$

$$Q_s = Q_d$$

Galilean experiments & capacities

- 'Galilean experiment' for the effect of c on e = expt in which c operates with no other causes of e operating and 'without interference'.
- IF c has a stable capacity for e, what occurs when c operates alone without interference shows what c's **contribution** is.
- The experiment does **not**
  - Show that c has a stable capacity wrt e.
  - Teach what the rule of combination is.

Models & Galilean thought experiments

- Many economic models depict Galilean experiments.
- In a real Galilean experiment, Nature's laws produce the effect; in a thought experiment the effect is produced by derivation from the principles built into the model.
- *If these principles are correct*, the model determines the 'contribution' of the cause – assuming there is a contribution to be discovered.
- As with real Galilean experiments, the model neither shows there is a contribution nor reveals the rule of combination.
- Examples: models for asymmetric information, skill loss, 'lemons', …

Measuring capacities v showing they exist

Sugden cites 4 conditions I gave in *The Handbook of Economic Methodology*.

- These are not conditions for 'showing that C has the capacity to produce E' (contrary to what I carelessly write there).
- They are conditions for showing: it is E that C has the capacity to produce, given that it has a capacity at all.
- As in the title *Nature's Capacities and their Measurement*, Galilean experiments – real and thought – can **measure** capacities.
- The claims that there is a capacity – that the 'analytic method' will work for studying the effects when C is present –needs support – lots of it – from elsewhere. (As with gravity!)

Central features of Sugden's account, ala Sugden

1. It sees models as paralleling the real world rather than isolating features of it.
2. The inference from the cause-effect relation in the model to that in the real world is by 'induction' ('abduction').
3. Warrant for the inference is based on judgements of 'salience and similarity'.

Exercise

Define ‘credible world’ as best you can.

Keep in mind in doing so that it should be something from which one can make an induction.

Sugden and isolation

- I think Sugden *is* talking about isolating models.
  - His examples generally have 1 cause that operates on its own without interference.
  - His language is that of isolating. He talks of studying 'abstract components' or 'particular mechanisms'.
- The difference is (in the new paper) that he doesn't expect there to be many causes with stable contributions. Contrast
  - If the same effect, predict the same cause as responsible.
    - May not apply often for model effects may not happen much. (So, economics is good at explaining things that don't happen much.)
  - If the same cause, predict the same contribution.
    - May not apply often if typical model causes don't have stable contributions.

What induction? From causes to effects

To characterize inference we need to specify the form of –

- the premises
- the conclusion
- the rule of inference joining the two.

Sugden 1 (earlier papers): **induction on causes**.

1. Premises of form: c causes e in M.
2. Conclusion of form: if an event similar to c occurs in T, e occurs in T.
3. Rule of inference: infer from 1 to 2 when
   - The c events are similar enough in right respects.
   - M's principles are correct. (Which he doubts?)
   - M describes a credible world.

What induction? From effects to causes

Sugden 2 (new paper): **induction on effects.**

1. Premises of form: c causes e in M.
2. Conclusion of form: if an event similar to e occurs in T, c is the cause of e in T.
3. Rule of inference: infer from 1 to 2 when
   - The e events are similar enough in right respects.
   - M's principles are correct. (Which he doubts?)
   - M describes a credible world
   - And there is no reason to think c is not present?

Problems

- Under 1 (same cause → same effect), the rule goes wrong unless
  - We add ‘c occurs in T and no other causes of e occur in T’.
    - Then the model will not help with many situations.
    - We have to know what other causes are to use the rule.
  - We change the conclusion to: e occurs as a contribution.
    - Then it is what I do.
    - And we must add to the restrictions on the rule that c has a stable capacity – which is learned outside M.
- Under 2 (same effect → same cause)
  - Since models are often isolating (1 cause) models, we wouldn’t expect the literal effects to occur often in the world. So again it won’t help with many situations.

Discussion questions

- What's a credible world?
- Are there many capacities in economics? How stable are they?
- Can you defend Sugden's attempt to draw inductive conclusions from a sample of 1?
- Does it matter that he is inferring from a model and not a real case? What are the advantages and disadvantages of each?