PHILOSOPHY OF ECONOMICS & POLITICS

LECTURE 20: MODELS & IDEALISATION

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As we’ve seen last week, contemporary political economists often explain phenomena such as variations in the form a welfare state takes in different capitalist nations by means of mathematical models.

These models always contain a large number of assumptions, many of which have to be regarded as plain false.

There seems to be a tension between the means and the end — explanations should be true (shouldn’t they?)

So our overarching question is: do mathematical, highly idealised models explain?

To organise the contributions to the literature aiming to understand models in economics I formulated a paradox.
The Explanation Paradox

- ... reads:
  - All economic models are false
  - Some economic models explain
  - Only true accounts explain

(A paradox is a set of statements, each of which is individually plausible but which are jointly inconsistent)
All Economic Models are False

* ... is literally speaking incorrect: a model is an object and as such neither true nor false

* We speak elliptically (e.g., all economic models ‘misrepresent’)

* Proof by means of a single case
Hotelling’s Law

- Is there **stability in competition**?
- Explanation: **goods differ in more than one respect**; call the vector of other respects (than price) ‘transportation costs’
- Assume: buyers of a commodity are uniformly distributed along a line segment of length l; two vendors A and B are at distances a and b, respectively, from each end of the line segment
- Production costs are zero
- Demand is perfectly inelastic
- From these assumptions Hotelling derives his ‘**principle of minimum differentiation**’
Some Models Explain

- Quantifyer is important: certainly models perform a large number of functions, explanation is at best one of them
- Heuristic
- Theory development
- Conceptual exploration
- Illustration of theoretical claims
- Difficult to make the claim without begging the question; hence:
  - Economists take some models to be explanatory
  - Intuitively, they are
Only True Accounts Explain

- This may be the least widely held of the three premisses but it follows from these two claims:
  - The best theory of explanation is that of causal explanation
  - Causal explanations need to be true to be successful
- Causal explanation is really the only game in town these days
- Economists hold it
- To say something ‘may have been caused’ by something else is not to explain it
All accounts of models deny at least one premiss

- Economic models are true after all
  - Galilean Thought Experiments
- Economic models do not explain
  - Conceptual explorations
- Open formulae
- Proving possibility results
- Explanation doesn’t require truth
  - Credible worlds-cum-unification
Economic models are true – in the Abstract

- This account ties models to an understanding of causes as factors with stable causal tendencies.

- A Galilean thought experiment is one in which we learn what a factor does ‘all on its own’, when no interfering causes are present.

- This is useful knowledge as the right kinds of factors continue to contribute to outcomes even in the presence of interfering causes.

- But can we understand economic models in this way?
Economic models are not Galilean Thought Experiments

- The account has prima facie plausibility; but
- Few idealisations in typical economic models are Galilean in nature
- Typical idealisations do not ‘assume away’ disturbing factors but rather ‘assume that’ systems have very specific characteristics
  - Set up business along a straight line
  - Transportation costs are linear
  - Demand is perfectly inelastic
What is the problem with non-Galilean idealisations?

- They tie the model result to a very specific system.
- That is, they do not normally help to predict when things are – as minimally as you may want to assume – different.
- But this means that they do not help to predict what happens in real systems, when we know that things are different.
- Perhaps model results are robust to specification changes anyway?
Economic Models are not Robust

- Kuorikoski, Lehtinen and Marchionni: **economics is a science of robustness tests**
- Reiss: No!
  - Robustness tests are difficult and therefore not always (normally?) possible.
  - When they are possible, results tend not to be stable across specification changes.
  - When results are stable, their stability is not normally an indicator of ‘assumption independence’
Economic Models are not Robust

- **Some factors that appear to play a role:**
  - Geometry, obviously
  - Reservation price
    - Hotelling result with high prices
    - With low reservation prices maximum or intermediate differentiation
    - Some reservation prices have a negative relationship with the amount of differentiation
  - Number of competitors (no stability when $n = 3$)
  - Transportation costs (maximum differentiation with quadratic costs in a setting otherwise identical to Hotelling’s!)
Economic models are not Explanatory

- This, in a way, is the weakest response but to be fair, its authors merely aim to point to alternative functions for economic models.

- Hausman: Models are models as such do not make claims about the world.

- But with a theoretical hypothesis asserting that some natural system is like a model, it turns into a theory.

- He hasn’t shown us how false theories can be explanatory.

- Alexandrova: models as open formulae.
Models prove possibilities

- Till Grüne-Yanoff: By proving possibility results models show that certain beliefs, formerly held to be necessarily true, are in fact false.
- Schelling: racial segregation can be a consequence of non-racist preferences.
- Schlimm 2009: intelligent behaviour be produced without a “vitalistic” element present in the organism.
- I do not deny that we can learn from models; but possibility claims are not explanations – they are possibly explanations.
Explanations Do not Require Truth

- Robert Sugden: Models as ‘credible worlds’

- This is all good and well; but why should we regard a model economists believe to be ‘credible’ as explanatory?

- Works as descriptive but not as normative account

- Economists’ views of what’s credible is highly theory-laden (mathematics, equilibrium, individualism, rationality...)

- Can we fill in the gap?

- One way: unification doesn’t require truth
Economic Explanation as unification

- This certainly is what economist want: ‘A theory is “simpler” the less the initial knowledge needed to make a prediction within a given field of phenomena; it is more ‘fruitful’ the more precise the resulting prediction, the wider the area within which the theory yields predictions, and the more additional lines for further research it suggests.’ ([Milton] Friedman 1953)

- For details, read the chapter

- In sum: economic models can hardly be said to be unifying because there are no good substantive principles that constrain the kinds of phenomena that could be modelled
Conclusions

- A genuine paradox is difficult to resolve
- The explanation paradox is genuine in this sense
- All attempts that have so far been offered have failed
- Where do we go from here?
  - Think harder about how false models do explain
  - Compare with physics: perhaps economics models unify after all?
  - A single model is not the right unit of explanation; we explain on the basis of everything we know about a phenomenon of interest