



# PHILOSOPHY OF ECONOMICS & POLITICS

## LECTURE 20: MODELS & IDEALISATION

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# Today's Agenda

- \* 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

- \* Quantifier 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