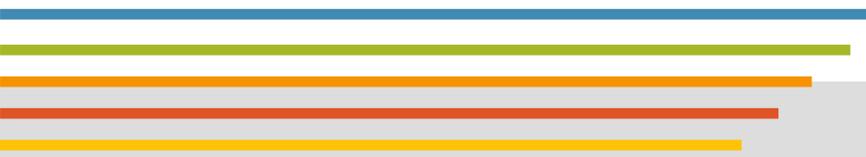


Troubles for Falsificationism



Philosophy of Economics

University of Virginia

Matthias Brinkmann

Contents

- 1. Falsificationism and Economics**
2. Putnam on Knowledge and Practice
3. Putnam on Auxiliary Statements
4. Relevance to Economics

Questions

- Does Hotelling's model follow falsificationist strictures?
 - ❑ Does it make falsifiable predictions?
 - ❑ Does it follow Popperian methodology?
- Does economics more generally follow falsificationist strictures?
 - ❑ Think of particular subareas of economics
- Does science (outside economics) generally follow falsifications strictures?

Some Problems

- Models are “born wrong”: we know from the beginning that their assumptions are wrong
- Little to no testing
 - ❑ E.g., Hotelling: only seems to look for confirmations, no experiment
- Ceteris paribus clauses (Hotelling’s Law)
 - ❑ Can statements with open-ended ceteris paribus clauses be falsified?
 - ❑ What does Hotelling’s model exclude?
- Predictions are only ever roughly true
 - ❑ “Inflation will normally rise when the money supply increases”—but that seems to exclude little
- Stochastic predictions (“inflation has an 80% probability to rise”)
 - ❑ Stochastic predictions cannot be falsified!

A Harsh Criticism

Despite the fact that preaching falsificationist methodology has been very popular among economists, the method fails to provide a reasonably adequate set of rules for doing economics. Strict adherence to falsificationist norms would virtually *destroy all existing economic theory* and leave economists with a rule book for a game unlike anything the profession has played in the past.

(Wade Hands, “Popper and Lakatos in Economic Methodology”)

Contents

1. Falsificationism and Economics
- 2. Putnam on Knowledge and Practice**
3. Putnam on Auxiliary Statements
4. Relevance to Economics

Putnam's First Criticism

- A feature of Popper's views: all theories are only conjectures; scientists should never call a theory knowledge, or truth, or even probable
- Popper uses "corroborated" to mean "has withstood repeated attempts at falsification"
- Putnam: that is implausible for the practice of science and every-day. There is a real difference between knowledge and conjecture

Putnam's First Criticism

1. Universal statements cannot be deductively proven, because of the problem of induction.
 2. To call something knowledge (or truth), we must be able to deductively prove it.
 3. Therefore, universal statements cannot be called knowledge (or truth).
- Putnam does not disagree on (1); he disagrees on (2).
 - Instead of (2), he seems to rely on something like:
Pragmatism. To call something knowledge (or truth) is to recommend to others that they can rely on this claim for practical purposes.

A Problem for Popper (Salmon)

1. Take all the non-falsified scientific theories. According to Popper, none of these theories are more probable, or more approximately true, than any other theory.
2. There is an infinite number of non-falsified scientific theories. (We can always make up some new theory which has not been falsified.)
3. If there is an infinite number of non-falsified theories, and if no theories are more probable, or more approximately true, than any other theory, then **there is no rational basis** to use one theory for prediction rather than another.

Imagine Popper claimed: we should test those theories that have withstood severe testing so far (the more “corroborated” theories)! What would you reply?

Contents

1. Falsificationism and Economics
2. Putnam on Knowledge and Practice
- 3. Putnam on Auxiliary Statements**
4. Relevance to Economics

Popper's Model of Falsification

1. If **general hypothesis**, then **particular observation**
2. **Not** particular observation
3. Therefore, **not** general hypothesis

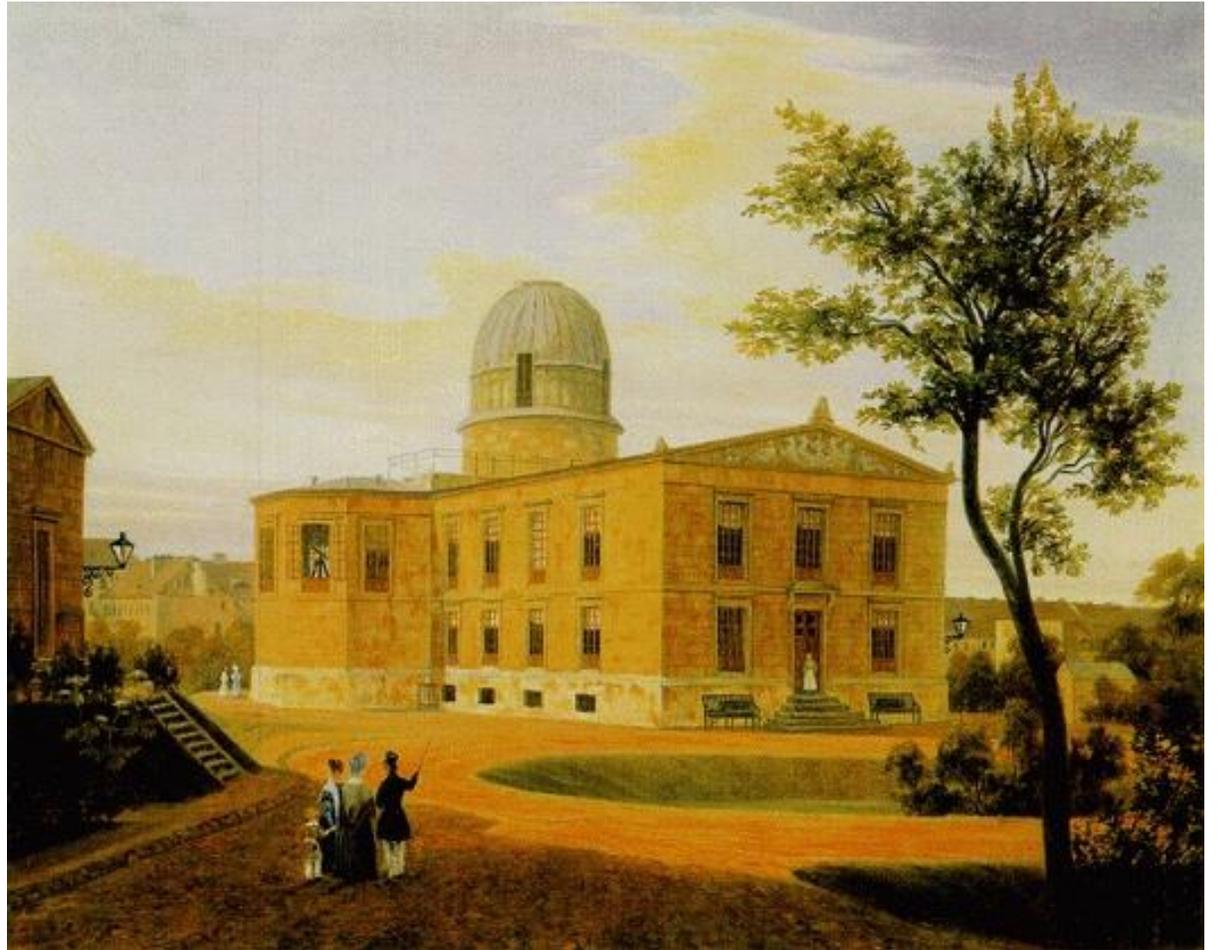
- Popper assumes that theories deductively entail predictions (he shares this assumption with the inductivists)
- Putnam (sec. 4): this is false
 - ❑ Scientific theories by themselves make no predictions! (p. 124)
 - ❑ Example: Newton's Theory of Gravitation (sec. 5)
- "The Law of Universal Gravitation is *not* strongly falsifiable at all; yet it is surely a paradigm of a scientific theory" (p. 126)

Modified Model of Falsification

1. If **general hypothesis** and **auxiliary statements**, then **particular observation**
 2. **Not** particular observation
 3. Therefore, **not** general hypothesis or **not** auxiliary statements
- One might claim that GH and AS together are “theory”—but this is implausible (sec. 6); the theory is only GH

The Discovery of Neptune

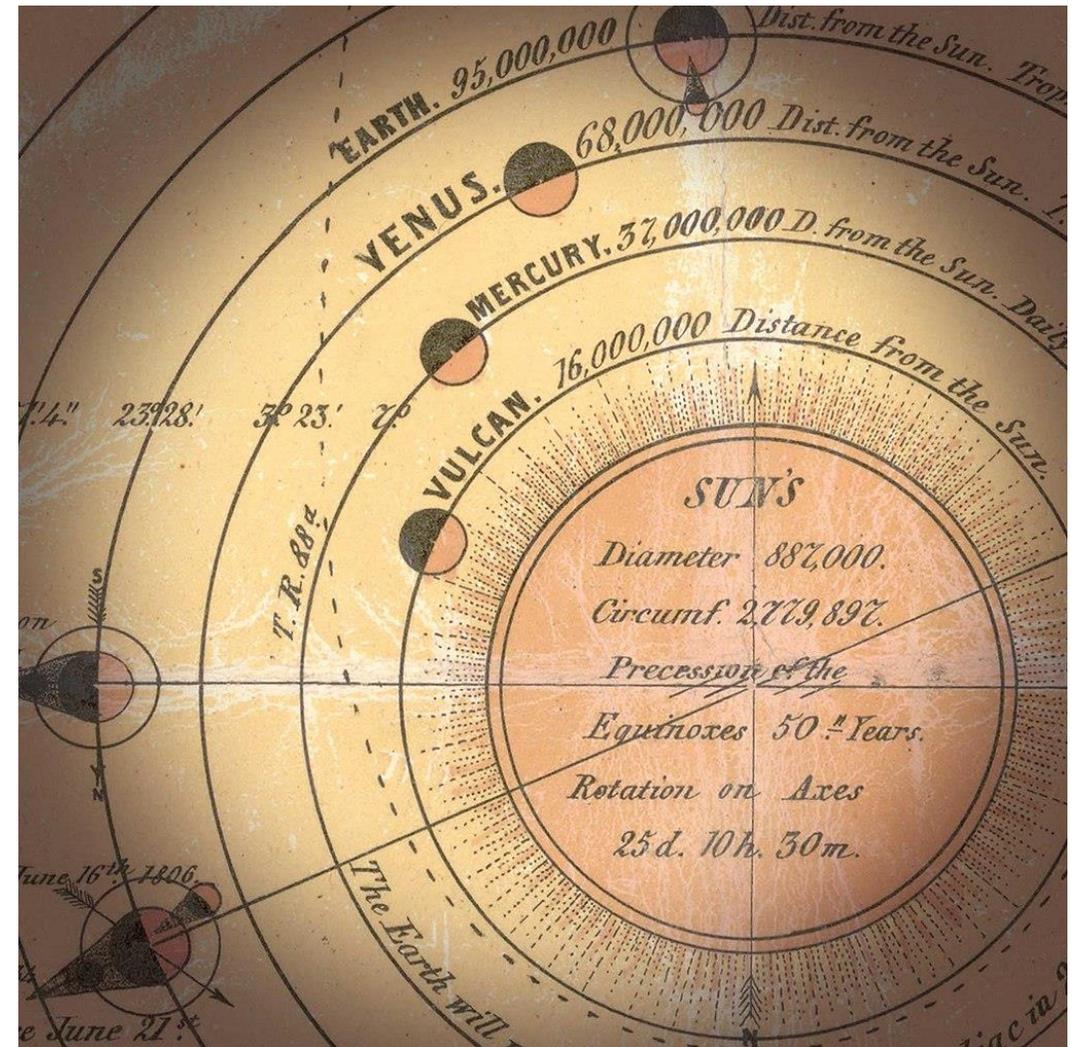
- **1686**: Newton's *Principia* is published
- **1781**: Uranus is discovered
- **1821**: Bouvard (amongst others) discovers that Uranus's orbit deviates from the predictions of Newtonian principles
- **1845/6**: Adams and Le Verrier independently predict the existence of an undiscovered planet
- **September 24, 1846**: Galle at the Berlin Observatory observes Neptune, close to the position predicted by Le Verrier



https://commons.wikimedia.org/wiki/File:Sternwarte_Berlin_Schinkel.jpg

The “Discovery” of Vulcan

- **1859:** Le Verrier studies the orbit of Mercury, finding that it also deviates from Newton’s predictions
- Le Verrier postulates the existence of another planet, **Vulcan**
- **1860/1878:** some “observations” of Vulcan are made, but the observations are inconsistent and unreliable
- **1915:** Einstein’s theory of general relativity predicts Mercury’s orbit, without postulating Vulcan



https://commons.wikimedia.org/wiki/File:Planet-Vulcan_1846_003790.jpg

Example

1. If Newton's theory of universal gravitation and
 - (I) no bodies exist except the sun and the earth,
 - (II) the sun and the earth exist in a hard vacuum,
 - (III) there are no forces at work other than gravitation,then the earth's orbit follows Kepler's laws.
2. The earth's orbit does **not** (precisely) follow Kepler's laws.
3. Therefore,
Newton's theory of universal gravitation is **false** or
 - (**not**-I) there are bodies other than sun and earth, or
 - (**not**-II) the sun and earth do not exist in a hard vacuum, or
 - (**not**-III) there are forces at work other than gravitation.

Popper's Reply

The [conjecture that there was an unknown planet in the solar system] was *auxiliary rather than ad hoc*: for although there was only this one *ad hoc* reason for introducing it, it was *independently testable*: the position of the new planet (Neptune) was calculated, the planet was discovered optically, and it was found that it fully explained the anomalies of Uranus. Thus the auxiliary hypothesis stayed within the Newtonian theoretical framework, and the threatened refutation was transformed into a resounding success.

I call a conjecture '*ad hoc*' if it is introduced (like this one) to explain a particular difficulty, but if (in contrast to this one) *it cannot be tested independently*.

Is this a convincing response?

Contents

1. Falsificationism and Economics
2. Putnam on Knowledge and Practice
3. Putnam on Auxiliary Statements
4. **Relevance to Economics**

Implications for Economics

- Think back to Hotelling's Model
- What is the **theory** / what are the **auxiliary hypothesis**?
- How would we derive **predictions** from Hotelling's Model?
- (Can we? Is the model meant to make predictions?)

An Actual Example (Cross 1982, 324)

H_0	the target hypothesis of stability;
H_1	the hypotheses used to define a relevant set of explanatory variables, $M^D = M^D(\dots)$;
H_2	the functional form $M^D = \dots$;
$H_3, H_4, \dots, H_\infty$	auxiliary hypotheses from the rest of economic theory;
O_1, O_2, \dots, O_M	the hypotheses adopted regarding the measurement of the variables involved in the theory;
T_1, T_2, \dots, T_M	hypotheses regarding the appropriate time lag structures involved in the H_2 relationship;
I_1, I_2, \dots, I_N	the hypotheses sufficient for the identification of H_2 from the observations;
C_1, C_2, \dots, C_P	the hypotheses underlying the <i>ceteris paribus</i> clause;
E_1, E_2, \dots, E_Q	hypotheses regarding the generation of the error terms in H_2 ;
S	the statistical inference rule adopted;
D	boundary conditions which delineate the range of empirical observations commensurate with the H_0 hypothesis.

Cross, Rod. "The Duhem-Quine Thesis, Lakatos and the Appraisal of Theories in Macroeconomics." *Economic Journal* 92, no. 366 (1982): 320–40. <https://doi.org/10.2307/2232443>.