

Referee Report

Here are my comments and thoughts on Da Silva's paper. Overall I quite liked it, although I had one major disagreement.

Comments on Da Silva:

- Argument 1 could be clearer: There seem to be two points:

(i) Lucas critique is not significant empirically.

(ii) Since there is "no theoretical model that can a priori prevent policy-parameter instability from occurring" there are "no theoretical implications whatsoever" of the Lucas critique.

I think the reader would be helped by a better exposition of point (ii). What property of macroeconomic models implies that they cannot, in theory, prevent policy-parameter instability from occurring? Answering that question would make the argument clearer.

- Argument 2 could also be clearer, but perhaps this is due to my lack of knowledge regarding the debate.

- Argument 4: I had some agreements and disagreements here. First, I agree that rational choice theory is not a good model of the psychology of human choice. But second, I strongly disagree that neurobiology has much to tell us about human choice.

The new imaging techniques will not provide the scientific results that are hoped for. There is a simple reason: there is a very complex mapping between intentional states and neural activity. It is very much like the relationship between software and hardware. For example, we could image the circuit-level electronic activity on a desktop CPU. But can we deduce, from this information, whether that CPU is running a Word Processor or a Spreadsheet? The simple answer is "no". Software is not reducible to the CPU hardware. Similarly, cognitive states, such as beliefs, desires, emotions etc., will not have unique neural correlates.

But the irreducibility of different "levels of reality" is quite ubiquitous in science, and it is one of the reasons why there are distinct fields of inquiry, with their own laws. Biology is not entirely reducible to chemistry, and chemistry is not entirely reducible to physics. Similarly, human decision-making is not reducible to neurobiology, which is why there are distinct fields of neurobiology and cognitive science.

So I think any project to understand human choice behavior in terms of neurobiology is misguided.

An entirely different argument undercuts axiomatic choice theory: the computational requirements required to make decisions surpass what the human mind can reasonably perform.

It is true, however, that neurobiology has plenty of contributions to make regarding the gross functional structures of the human brain, in particular how different parts of the brain take "short cuts" and use "rules of thumb" associated with the emotional part of

our brains, which do not conform to the strict, time-independent idealizations of rational choice theory.

However, statements along the lines of: "Neuroscience has now made it possible to measure utility objectively" are nonsense. They should be removed!

- Argument 5: I like this section overall.

In conclusion, my main problem with the paper is that it recommends deepening microfoundations by finding a better theory of individual economic behavior in the realm of neurobiology. This seems entirely wrong to me. The other part of the paper -- which recommends statistical approaches based on large ensembles of economic actors -- is better, but seems to imply, for macroeconomics at least, that we can entirely jettison rational choice microfoundations. In which case, there is little or no motivation for economists to start interfacing with neurobiology. Just like biology is relatively autonomous from chemistry, I think macroeconomics is relatively autonomous from individual psychology. So I would find more agreement with the paper if it made this point, and did not recommend deepening microfoundations.