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In *Structural vs Atheoretic Approaches to Econometrics,* Michael Keane refutes a number of criticisms of the structural approach to econometrics. His key argument is that, while structural estimation usually relies on a number of strong assumptions, so does reduced form estimation. The difference is that reduced form papers tend to leave many of the strong assumptions implicit. This argument, combined with Keane's emphasis on rigorously evaluating structural models based on their success in out-of-sample predictions, makes a compelling case for the structural approach to econometrics.

Among other examples, to show that reduced-form estimation relies on strong theoretical assumptions, Keane focuses on a study which attempts to estimate the effect of military service on earnings by using military draft eligibility as an instrument. Keane first points out that, without a set of implausible assumptions, the estimated effect size only applies to those that were forced to join the military due to the draft (the implausible assumptions include homogeneity in the earnings effect of the military or that one's decision to join the military was uncorrelated with one's gains from joining). Furthermore, Keane points out that interpreting the estimated effect size as "the effect of military service" is questionable without assumptions about how specifically the draft was affecting their earnings. In the end, the example shows that, even in the cases with a seemingly ideal instrument, many theoretical assumptions are needed to make a meaningful inference. Also, importantly, when these theoretical assumptions are left implicit, it is much easier to be overconfident about the usefulness of the estimates. Thus, the fact that the underlying theoretical assumptions are made explicit in structural estimation is a clear advantage.

Now, I do think it is important to note that Keane does not mention cases in which the treatment variable itself, rather than some instrumental variable, is randomized. This is a surprising omission, especially considering that he uses the natural sciences as an example so often in his paper. It seems clear that many other fields make use of randomized control trials, and that some of these studies could be called atheoretic. For example, in medicine it is common that the exact mechanism by which a treatment is effective is not known, but because the clinical trial results are positive, the treatment is administered. Examples like these could potentially challenge Keane's statement that atheoretic work "has almost never led to scientific progress in the past" (18). That being said, in many areas of economics randomized experiments are impossible to perform, and thus Keane's criticism of atheoretic observational studies is still a powerful argument in favor of the structural approach.

Another important part of Keane's paper is the focus on validation of structural models. This is important because another common criticism is that structural estimation is prone to the making of arbitrary assumptions. Keane stresses that *good* structural work would test an estimated model against out-of-sample observations. Because a major objective of economic research is to predict the effect of future policy interventions, this can arguably be a better standard than simply looking at statistical significance.

Although Keane does not mention any other criteria for evaluating structural models, I believe other important criteria exist. If possible, one could check whether the predictions of the model are significantly changed when some of the more questionable theoretical assumptions are changed. For example, if a different, but still plausible utility function is used, do we get the same policy recommendations? Also, the predictions and theoretical assumptions of the model can be evaluated based on how well they agree with other successful theories. For example, Keane mentions that he is skeptical of a reduced form paper that finds a high return to education because he thinks that if the return were that high, more people would get the education (17-18). These potential conflicts between theories are important not only in affecting our confidence in an empirical estimate, but also in guiding future research (in physics, much research is based on resolving conflicts between two successful, but contradictory theories). In this way, the structural emphasis on explicitly laying out all a priori assumptions is shown to be even more valuable, as it allows for researchers to clearly evaluate the plausibility of their results and interpretations.