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Comments on: Michael P. Keane ‘Structural vs. Atheoretic Approaches to Econometrics’

by

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## 1 Overview

In this paper Michael Keane makes a series of important points and raises a number of key concerns. His is a comprehensive assessment drawing on a line of research in which significant advances have been made in our knowledge, many by Keane and his coauthors. This research deserves to move in to the centre stage and this paper serves to encourage that move.

In my comments I want to pick up on a couple of issues which I feel are worthy of further discussion. The first concerns the variety of ‘questions’ being addressed in empirical microeconomic research. The second concerns the variety of ‘structural’ models that are found in econometrics. I ask the question: Can we really be so categorical about choosing one approach in empirical microeconomics?

## 2 Experimental and Observational Evidence

Empirical analysis in applied microeconometrics is typically at its best when addressing a sharp question. Often the assessment of a specific policy reform. But the nature of the questions varies widely. They range from the measurement of a simple average impact of some past reform, to the prediction of behaviour or welfare costs under some newly proposed reform. For the first it may be unnecessary to unravel preferences (or technology) from constraints but for the second it will be essential.

Although a structural framework would seem to be a prerequisite for interpretation of any policy reform, the degree to which a stochastic structure needs to be completely specified and empirically implemented will depend on the question to be answered. (Quasi-)Experimental contrasts can answer some ‘structural’ questions, but they cannot answer all. Indeed the range of questions to which they provide answers is often quite limited. But even where they are limited, experimental contrasts can be informative as part of a complete research strategy. For example, the Progresia experiment has been used very imaginatively in informing structural models of education choices, see Attanasio et al (2005) and Todd and Wolpin (2006). Of course, Keane recognizes this but the combination of experimental and observation evidence warrants further

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serious consideration as a creative way forward for building credible structural models.

The estimation of structural models forces us to line up the different implications of the economic theory with the evidence, whether it be observational or experimental. They require a logical consistency across a number of contrasts whereas (quasi-)experimental approaches typically recover only a single contrast.

The most convincing of the quasi-experimental approaches have come from four sources: well designed randomised control trials, such as the Progresia experiment referred to above and the Self Sufficiency Program in Canada (see Card and Hyslop (2005)); area based piloting of new policies which can allow us to assess the importance of spill-over and general equilibrium effects (see Blundell et al (2004)), externally driven differential trends across groups as in the analysis of tax reforms (see Blundell, Duncan and Meghir (1998)), and the clever use of discontinuity designs (see Card, Chetty and Weber (2007)).

Poorly designed quasi-experiments have little to offer, but so do poorly focussed structural estimations.

### 3 Identification and Validation

There are clearly common themes in the identification of any structural model whether we are dealing with a ‘simple’ linear additive structural model or a ‘rich’ discrete nonlinear system. However, the choice of technique and our ability to relax incidental (but often critical) assumptions differs substantially across different types of structural model specification.

There has been considerable recent progress in our understanding of the identification of nonlinear stochastic models. These models come closer to the types of specification applied microeconomic researchers like to adopt. This progress covers structural equations with heterogeneous coefficients (see Heckman and Vytlacil (2005) and Imbens (2007)), as well as nonlinear systems with non-separable heterogeneity (see Matzkin (2007), Imbens and Newey (2003) and Chesher (2003, 2007)). Nonetheless, it is fair to say that progress in developing estimators that are robust to incidental assumptions has been slower than the pace of application.

For many structural discrete stochastic choice models that are used in application we do not yet have conditions for nonparametric identification. Keane notes this and suggests that such considerations of non/semiparametric identification should be replaced by sample hold-out validation studies, to quote ‘Certain primacy for validation exercises over identification analysis for purposes of building confidence in models.’ But validation and identification are addressing different concerns.

Understanding the identification of the structural model is a key part of the econometrics toolkit. In empirical microeconomic models with complicated nonlinearities and observation rules, proving identification is particularly demanding, but necessary. Identification also allows the researcher to pinpoint

where there are overidentifying restrictions that can be used to test the structure. In some case structural restrictions may only provide partial identification, but nonetheless informative in understanding behaviour and policy responses, see Manski (2003, 2007).

Out of sample validation is useful but does not offer a substitute for the development of identification results for more complex models that are used in application. Econometric theorists should not be let off the hook so easily. The fact that research on identification lags behind in addressing models that applied researchers feel are interesting should continue to act as a stimulus for econometric research.

## 4 Concluding thoughts

So, can we really be so categorical about choosing one approach in empirical microeconomics? I think not. Even in a reasonably simple policy evaluation, the choice of method in empirical microeconomics depends on three broad concerns:<sup>2</sup> the nature of the question to be answered; the type and quality of data available; and the mechanism by which individuals are allocated or receive the policy. The last of these is typically labeled the ‘assignment rule’ and is a key component in any policy evaluation. Alternative methods exploit different assumptions concerning assignment and differ according to the type of assumption made. In a perfectly designed social experiment, assignment is random. In a structural microeconomic model, assignment is assumed to obey some rules from economic theory. Unless there is a convincing case for the reliability of the assignment mechanism being used, the results of the empirical analysis are unlikely to convince the thoughtful skeptic. Just as an experiment needs to be carefully designed, a structural economic model needs to be carefully argued.

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