Problem Set 1

MACS 40200, Dr. Evans
Peiyao Sun

Problem 2

Comparing to reduced form estimation approach, I would prefer structural estimation approach because it makes the assumptions more explicitly, avoids the issue with instrument variable problem, and leads to better understanding of economic explanations.

First, both approaches rely heavily on theoretical assumptions but structural estimation approach makes assumptions more explicitly. The experimentalist criticizes that the structural estimation approach requires strong assumptions which make them unconvincing, however, as Keane says, "it is not possible to learn anything of interest from data without theoretical assumptions, even when one has available an 'ideal instrument'"(Keane, 4). Atheoretical "experimentalist" approaches do not rely on fewer or weaker assumptions than do structural approaches, but just left assumptions implicitly. "If we want to do more than just summarize datait is impossible to escape the need to make a host of very strong assumptions" (Rust, 22).

Secondly, we can hardly find an ideal instrument variable in the real world, and even if we find out, there're still too much assumptions we rely on. The estimate of the "effect" of X on Y depends on what instrument we use. Keane introduces an example from Angrist's article(1990) to illustrate the inefficiency of instrument variable. Vietnam era draft lottery numbers - which were randomly assigned but influenced the probability of "treatment" (i.e., military service) - is deemed as an instrument to estimate the effect of military service on subsequent earnings. However, such an "ideal" instrumental variable only identifies the effect on sub-population whose behavior is influenced by the instrument, and when the service's effects are heterogeneous in the population, lottery number can not be deemed as an ideal instrumental variable despite that it is randomly assigned.

Moreover, structural estimation approach can lead us to obtain a deeper understanding of economic phenomena and conclusions about causal effects while experimental doesn't. As Keane said, "Data cannot determine interesting economics relationships without a priori identifying assumptions, regardless of what sort of idealized experiments."(Keane, 4) It is not clear from Angrist's estimates what causes the adverse effect of military experience on earnings. Just as Keane pointed out, if the work is to guide future policy, it is also important to understand what mechanism was at work. The "experimentalist" approach to empirical work has not helped clarify issues of identification. In a structural approach, in contrast, the parameters have clear economic interpretations.

However, there's not all right about what Keane said, Keane's clearly preference towards structural estimation approach makes him biased even when facing some extreme situations in which experimental approach clearly deal better. I would agree more with Rust, who not only realizes the explicit advantages of structural approach, but also encourages and allows the exploration with other methods.

References

Keane, Michael P., "Structural vs. Atheoretic Approaches to Econometrics," *Journal of Econometrics*, May 2010, *156* (1), 3–20.

Rust, John, "Comments on: 'Structural vs. Atheoretic Approaches to Econometrics' by Micahel Keane," *Journal of Econometrics*, May 2010, *156* (1), 21–24.