Problem Set #1

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Problem 2

Recently, reduced form estimation is more widely used in economic research rather than structural estimation. However, using structural estimation provides more benefits in interpreting estimation results and identifying parameters. Despite the difficulty in validating the correctness of structural estimation, it makes the interpretation of parameters more meaningful. On the other hand, reduced form estimation might make the interpretations difficult without making the assumptions of instrumental variables (IV). Moreover, structural estimation can be the only way of forming a model when IV is not available.

In the first place, structural estimation makes the interpretation of parameters more meaningful. Keane uses an example of the study of Angrist regarding the effect of military service on subsequent earnings. Angrist estimated the effect by using a lottery as an IV that generates randomness to create treatment group and control group. He concluded that military service reduced annual earnings by approximately 15%. Nonetheless, Keane claims that the IV only identifies the effect on the subpopulation whose behavior is influenced by the instrument. This estimation does not provide the information on what causes the adverse effect of military service on earnings. Therefore, Angrist would have failed to provide a meaningful interpretation without adding assumptions on the lottery (e.g. monotonicity assumption). In other words, as Rust argues, since reduced form estimation is limited by the technicality issues such as the endogeneity of independent variables, it may prevent researches from conducing meaningful regression analyses.

On the contrary, although structural estimation requires many assumptions to be laid out explicitly, it makes the interpretation of parameters easier. Keane raises Imai and Keane's life-cycle labor supply model as the example of structural estimation where valid IV's are not available. By adopting structural estimation, they succeeded in simplifying the method to interpret the inter-temporal elasticity of substitution. Rust argues that structural estimation heavily focuses on economic theories and their formulation. Thus, structural estimation is less restricted by econometric issues, while the validation of models requires considerable efforts. Nevertheless, by estimating the functional form through structural estimation, Imai and Keane clearly identified the parameter of the inter-temporal elasticity of substitution.

Lastly, Keane argues that, without a priori assumptions, any interesting relationships cannot be found in data. In other words, he claims that we cannot let data speak. However, I believe that relationships exist among datasets even without making assumptions. For instance, if we look at the data of annual earnings and education attainment, there may exist a positive correlation between two variables. It can be found by establishing a hypothesis that they are positively correlated, but the relationship exists regardless of making assumptions. Thus, we can let the data speak, and, by creating a priori assumptions, we can understand what the data are speaking.