

Simultaneity and OLS Estimates

We know simultaneity will lead to inconsistent estimators with OLS, biased even in large samples

But this does not imply that OLS estimates are no use

1. May be able to say something about the direction of the (large sample) bias. E.g. in the demand and supply when don't know if D or S curve do know that the slope of the S is positive and the slope of the demand is negative. So when we get an estimate of elasticity we have a practically useful conclusion.
2. May be able to say what the curve is. E.g. if the supply curve shifts it traces out the demand curve. If the demand curve shifts it traces out a supply curve. This is Workings concept of the identification problem. He suggested adding an extra variable to the demand equation

$$q_t = \beta_{11}p_t + \beta_{12}y_t + u_t$$

$$q_t = \beta_{21}p_t + v_t$$

would reduce the variance of u_t and give a better estimate of β .

3. This is not the same as the concept of identifying we have been considering, his concern was OLS bias not consistency: $plim \hat{\beta}_1 = \beta$ is consistent
4. If include all relevant explanatory variables in the demand function then σ_u^2 is very small, whereas the supply function only has price. Thus even if the demand function is not identified are still justified in using OLS. However, if the supply function is overidentified σ_v^2 is very large and will get a poor estimate even if consistent. So, LS estimate of an underidentified equation can still be worthwhile
5. Instead of just counting the number of exogenous variables should look at how high the intercorrelations are.
6. There are also problems of what constitutes an exogenous variable. The Cowles Commission determined this before estimation, but can seem rather arbitrary in practice.
7. Also issue of normalisation in simultaneous system. Depends on economic theory which gives causality
 - in an exactly identified system it wont matter.