Econ 35100, Winter 2019

Consider a model of trade and domestic production networks:

1. Simulate an economy with 100,000 firms. Use the model setup from TKMD. Take export and import participation of firms as given. Try to match moments from the Belgian data presented in TKMD on `number of importing firms,' 'number of exporting firms,' `labor share in cost', `productivity', intermediate share, number of suppliers, number of customers, total number of connections in the economy, aggregate ratio of imports to GDP, …

   Calculate the total foreign input shares for each simulated firm and calculate the real wage change from going to autarky.

   Simulate a 10% increase in the import price and calculate the change in the real wage.
   Here: hold the network fixed.

2. Endogenous acyclic network. Assume common fixed cost for adding suppliers (this greatly simplifies the firm's discrete choice problem, as there will be an obvious ranking of supplier for each firm). Also ignore firm-pair-specific heterogeneity in input shares, there is a common alpha. Have at most 300 eligible suppliers, that are randomly drawn from the set of firms coming earlier in the ordering.

   Repeat the counterfactual analysis in 1.

   Note: When simulating random draws from distributions, it can help to truncate at the 99.5 percentile to avoid numerical instability or equilibrium existence issues.

3. Simulate a set of idiosyncratic shocks to firms. What kind of parameters would you recover from running some of the reduced form equations that are considered in the literature?

4. *Bonus question, Hard (perhaps infeasible):* Solve numerically the problem of a social planner. Compare welfare to the equilibrium outcome in 2. You may want to consider an integer programming solver such as CPLEX, IPOPT, Gurobi [however, the scale (100k firms) may be infeasible].