

### Simulating the Effects of a Horizontal Merger

1. Download the data from the course web-page and use to it estimate the following (Logit) model:

$$u_{ijt} = \alpha p_{jt} + x_j \beta + \xi_{jt} + \epsilon_{ijt} \quad i = 1, \dots, I, j = 1, \dots, J, t = 1, \dots, T,$$

where  $\epsilon_{ijt}$  is distributed i.i.d extreme value. The notation follows that used in class. The vector of characteristics,  $x_j$ , contains a constant, sugar content and a mushy dummy variable (=1 if cereal gets soggy in milk). Note: the Logit model sets the “non-linear” part to zero, so you will only use what is called  $X_1$  in the data (and not  $X_2$ ).

Estimate the following 4 specifications: (i) OLS without brand fixed effects, (ii) OLS with brand fixed effects; (iii) IV (using the instrumental variables provided in the data) with and without brand fixed effects. For each specification report the estimated coefficients and their standard errors.

2. Using the results for the last specification (IV with brand fixed effects) compute the own- and cross-price elasticities. Compute these for each of the markets and report the median across markets. To save space you can report these for a subset of the products. Are there any particular patterns in the elasticities?
3. Using the results for the last specification (IV with brand fixed effects) and the price elasticities, compute the markups predicted by a (i) single-product Nash-Bertrand equilibrium; (ii) a multi-product Nash-Bertrand equilibrium; and (iii) joint pricing of all the brands. For each model report the median of the distribution of the markups and margins. Are there any particular patterns in these numbers?
4. Using the estimated markups to compute the implied marginal costs. Report the median of the implied marginal costs.
5. Use the pre-merger estimate of marginal costs, the estimated price elasticities and an assumption of multi-product firm Nash-Bertrand post-merger equilibrium to simulate the post merger equilibrium. Explain exactly each step. Simulate the effect of a Post-Nabisco merger and GM-Quaker merger. (A company can be identified by the first digit in the id variable. GM=2, Post=3, Quaker =4, Nabisco=6). Report the changes in the equilibrium prices and quantities (relative to a pre-merger multi-product Nash-Bertrand equilibrium).
6. Discuss the potential issues with the analysis you preformed in the previous question. Offer at least four separate issues. How can you deal with these issues?