

### **Suggested Solutions**

See the Matlab code and output. Here are a few comments.

1. You mostly got the right answers here, with one very common mistake. When brand dummy variables are included in the regression (OLS or IV) in order to recover the coefficients on sugar and mushy you cannot simply drop a couple of the dummy variables. The results, depend on which variables you drop. You need to use a second stage minimum-distance procedure. The basic idea is simple. You run the regression with price and 24 brand dummy variables (no constant). You then take the 24 estimated coefficients and use them as the dependent variable (with 24 observations) in a GLS regression, where the independent variables are a constant, sugar and mushy, and the weight matrix is the var-cov matrix from the first stage. See the attached code on how to do this in practice. You can read up on the basic idea in the lecture note on production function (in the section titled  $\Pi$ -matrix) or at the end of Section 3.5 in my JEMS article.
2. Most of you computed the correct numbers. The patterns are fairly obvious: the cross price elasticities do not vary within a column. Also the own-price effects increase, in absolute value, with price.
3. The key pattern is that the margins are constant within a firm (or across firms if they are colluding). This is directly a result of the Logit structure. Obviously, this is a strong implication (that might not be met in many cases). However, it is a very useful property to know.
5. A common mistake is that you did not let the elasticities (the matrix  $\Omega$ ) vary with price. See the attached solutions.
6. There are several potential issues with the analysis you performed in the previous question. Here are just a few of them. First, the Logit model is restrictive. In principle, however, we could have used a more flexible demand system. Second, the above analysis assumed marginal costs are constant post-merger. Many mergers are motivated by cost efficiencies. This could be examined by changing the marginal costs and computing the effects on the equilibrium. Third, the analysis assumes that the merger will not change the products offered or any other dimensions of firms strategies (such as advertising). In order to deal with this we'll need a model of how firms set the strategies in these dimensions. Fourth, the model assumes that conduct post-merger is Nash-Bertrand. One of the concerns raised with mergers is that they increase the likelihood of collusion. In order to deal with this we need a model of how the change in concentration increases the likelihood of collusion. Finally, the analysis, both demand and supply, was static.