

Empirical Industrial Organization & Consumer Choice

2c Part 2

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Exercise: Estimating a Nested Logit Model with Car Market Data

This exercise is based on Frank Verboovens data set `cars.dta` on automobile sales in different European markets, which you can find on Moodle.

- a). Load the data `cars.dta` and select only the rows that correspond to the German market. The variable `cla` describes the segment of each car model. Generate a figure that shows total sales for imported and German cars for each year and each segment.
Hint: You have to generate a variable that specifies whether the car is imported. Recall that the function `view.stata.var` in the package `sktools` provides you with a description of the different variables in the data set.
- b). Specify a nested logit regression with nests given by the segment `cla`. Make an assumption about total market size M and compute the corresponding market shares $s_0, s_j, \bar{s}_{j|g}, s_f$ and $s_{f|g}$. Choose appropriate explanatory variables (product attributes, an appropriate price measure, possibly time dummies). Also Discuss your specification.
- c). Estimate your model first via OLS. Then generate appropriate instrumental variables and estimate your model via IV. Discuss under which conditions each estimator is valid. Discuss the estimation results.
- d). Choose an interesting subset of 4-6 car models, some coming from different segments, and calculate the own and cross price elasticities. Discuss your findings.

- e). Estimate your nested logit model using an IV estimator for different assumptions on the total market size. Illustrate how the estimated coefficient $\hat{\alpha}$ on the price effect changes with the assumptions on market size.
- f). Specify a model of firms' marginal production cost as a function of product attributes and estimate the cost coefficients under the assumption that the multi-product firms compete á la Bertrand (the variable firm in the data set describes for each car model the firm that produces it).
- g). Use your estimated model to simulate market prices if the firms compete á la Bertrand. Compare the simulated prices with the actual prices.
- h). Now use your model to simulate a merger between two or more firms (e.g. VW and Opel). Analyse how average prices, market shares and profits in different segments and for prices of particular models would change due to the merger under the strong assumptions that the merger does not affect the set of car models and cost functions. Do the market shares of the models of the merged firms go up or down? Who benefits more from the merger, the merged firms or some competitor?