

Joseph Rossetti

Product Variety in the U.S. Yogurt Industry: An application of discrete choice models of demand and strategic interaction

My research investigates the determinants of the variety of products offered in consumer goods industries. Firms in consumer goods industries must decide which set of product lines to offer. I model this as an entry exit decision across a set of possible product markets. Understanding how the variety of products offered by firms is determined is important due to its large impacts on consumer welfare. Also, the effect of changes in market concentration, like mergers, on product variety, depends on the specific features of the industry: the elasticity of demand, types of product differentiation available to firms, and competition from regional or niche producers. I highlight the differences between the yogurt industry and other industries that have been studied, and how these differences alter the effect of market concentration on product variety.

In my job market paper, I estimate a model of product entry and exit in the U.S. yogurt industry from 2001-2011 using supermarket scanner data from the IRI Marketing Database. I use a two-step procedure. I first estimate yogurt industry demand and variable costs using the standard framework of Berry et al. (1995). I account for store level adoption of product lines, and brand advertising decisions in a reduced form. In the second step, I estimate the fixed costs of offering a product. Estimation of the fixed cost is complicated, because firms can offer any subset of the potential product lines in the industry, but I only observe in the sample a small number of the possible combinations of products. I apply the pairwise maximum score estimator of Fox (2007), which provides consistent estimates in settings with large choice sets. I use the first stage estimates to compute firms' expected variable profits from offering alternative sets of products and choose the fixed costs parameters to maximize the number of times the model predicts that the firms' observed choices were optimal. I find that the firm's fixed costs increase by \$1.5 million dollars when it offers one more product nationwide in a quarter. In a counterfactual analysis, I find that the monopolist has a preference to offer more unique products than the competitive industry, but that the increased product variety is not enough to compensate consumers for the increases in prices.

In my dissertation, I also study the consumer welfare changes that have occurred in the U.S. Yogurt industry due to the adoption of several new products lines between 2001 and 2011. Previous work on changes in consumer welfare in consumer goods industries has focused on the introduction of one or two new products or brands. The U.S. Yogurt industry has seen the introduction of 16 new product lines in my sample period. Studying a larger sample of introductions will improve the understanding of how new goods affect cost of living.

In my dissertation I also discuss the computational methods used in my research. I have developed an R package for simulating counterfactuals using demand estimates. I define classes that represent markets with random coefficient or standard logit demand. Each class has a method that computes Nash prices using the zeta-fixed point algorithm of Morrow and Skerlos (2010), and has methods for other tasks like recovering variables costs or consumer welfare from estimated demand. The goal for this package is to make it easier for researchers to simulate mergers and other counterfactuals, and simulate data from random coefficient and logit demand models.