ECON-L1350 - Empirical Industrial Organization PhD I: Static Models

Lecture 6

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About today's lecture

- Today's lecture is a reading group. We will read Döpper, H., MacKay, A., Miller, N. & Stiebale, J. (2023). *Rising markups and the role of consumer preferences* (tech. rep.). DICE

- Learning to read papers and to learn from papers is a key skill to be learned.

What to evaluate in a piece of (structural IO) research?

1. What is the research question?
2. Why would one be interested? and how do the authors motivate the reader on the importance of the research question?
3. What is the contribution, i.e., how does the paper add to our knowledge / toolbox?
4. What existing papers are relevant (come close) to the paper?
5. What's the data? Is it fit for purpose - why and/or why not? Do you learn something useful from the descriptive analysis in relation to the objective of the paper?
6. What's the model? does it fulfill the criteria we discussed in lecture 1 on the requirements of structural models? what is good and not so good about the model?
7. Do you understand the estimation procedure? are you satisfied it is done correctly?
8. What are the key results re estimated parameters?
9. If there are any counterfactuals, are they well motivated? Well executed? What do we learn?
10. What are the key conclusions based on the empirical exercise?

Table 1

Table 1: Sample of Product Categories

Rank	Product Category	Observations	Revenue ($ Millions)	Retailer-DMA Combinations	Brands Per Market	Share Top 20 Brands	Share Private Label
1	Cereal - Ready To Eat	231,178	22,557	333	19.3	0.58	0.08
2	Candy - Chocolate	229,065	16,162	335	18.9	0.54	0.03
3	Candy - Non-Chocolate	225,336	9,420	334	18.6	0.61	0.14
4	Deodorants - Personal	221,618	7,186	333	18.3	0.79	0.00
5	Soap - Specialty	214,153	5,563	355	17.5	0.68	0.05
6	Tooth Cleaners	212,056	7,343	333	17.6	0.71	0.00
7	Shampoo - Liquid/Powder	202,923	7,490	332	16.8	0.65	0.04
8	Cookies	202,880	17,191	334	16.8	0.64	0.18
9	Sanitary Napkins	201,864	5,128	333	16.7	0.79	0.18
10	Cold Remedies - Adult	201,134	9,111	332	16.6	0.85	0.40
20	Bottled Water	160,454	23,333	335	13.2	0.90	0.38
40	Baby Formula	133,082	10,616	323	12.1	0.76	0.05
60	Nuts - Bags	107,314	6,500	334	8.9	0.79	0.24
80	Fresh Muffins	85,228	3,899	332	7.6	0.85	0.17
100	Tuna - Shelf Stable	68,711	4,099	332	5.7	0.98	0.13
120	Cream - Refrigerated	52,297	3,402	330	4.6	0.70	0.30
130	Frozen Poultry	33,428	2,145	300	3.9	0.86	0.27
133	Fresh Mushrooms	25,510	2,772	246	3.4	0.95	0.28
	Mean Values	108,442	6,766	319	9.8	0.84	0.16

Notes: This table shows summary statistics for a selection of product categories. The chosen categories are sorted by the number observations in the estimation sample and are indexed by *rank*. *Revenue* provides total sales in millions of nominal US $ from 2006 to 2019. The two groups are separated by a horizontal rule. Statistics are calculated after the data cleaning steps described in the text. The last three columns report raw means across retailer-DMA-year-quarter markets. Shares in this table reflect inside shares (i.e., excluding the outside good).

Figure 1

Figure 1: Prices and Marginal Costs of Coffee Over Time
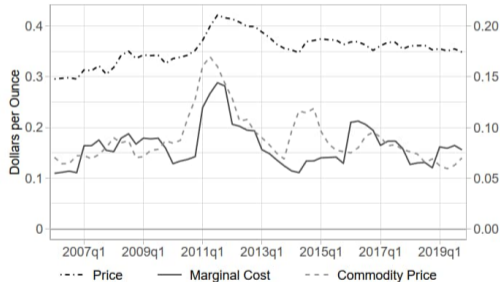
Notes: This figure plots the time series of quantity-weighted prices and marginal costs (solid line) for ground/whole bean coffee. Prices are observed and marginal costs are recovered from the profit-maximization conditions. Also shown is the commodity price index for coffee (dashed gray line), which is scaled following the right axis.

Table 2

Table 2: Average Product-Level Own-Price Elasticities of Demand

Category	Our Estimate	Literature Estimate	Citation
Beer	−4.06	−4.74	Miller and Weinberg (2017)
Ready-to-Eat Cereal	−2.29	−2.42	Backus et al. (2021)
Yogurt	−3.12	−4.05	Hristakeva (2020)

Notes: The Miller and Weinberg (2017) estimate is the median product-level elasticity obtained with the RCNL-1 specification. Our corresponding estimate is the median own-price elasticity across all years, combining "Beer" and "Light Beer," which are not distinguished in Miller and Weinberg (2017). The Backus et al. (2021) estimate is the median product-level elasticity obtained with the "prices only" specification; our corresponding estimate is the median own-price elasticity across all years. Hristakeva (2020) reports a mean product-level elasticity from 2001–2010; to make things more comparable, we report our estimated mean own-price elasticity from 2006–2010.
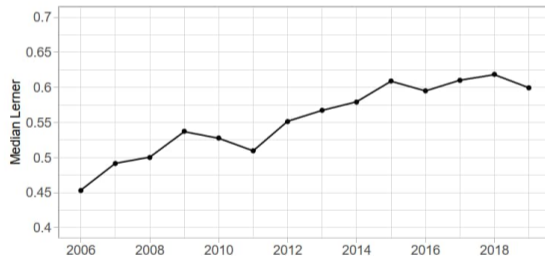
Figure 2

Figure 2: Implied Elasticities Under Alternative Identification Restrictions
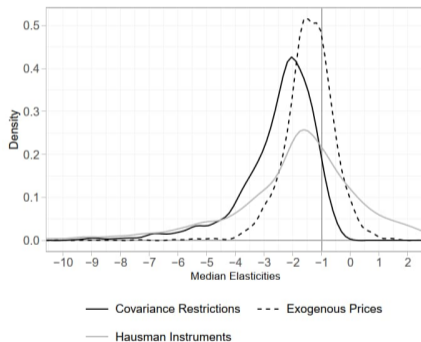
Notes: This figure plots the density of the median own-price elasticity by category and year under different identification assumptions. The solid black line shows the density of implied elasticities using covariance restrictions. The dashed line shows the density of implied elasticities assuming exogenous prices. The solid gray line shows the density of implied elasticities using Hausman instruments. The vertical line indicates an elasticity of -1.
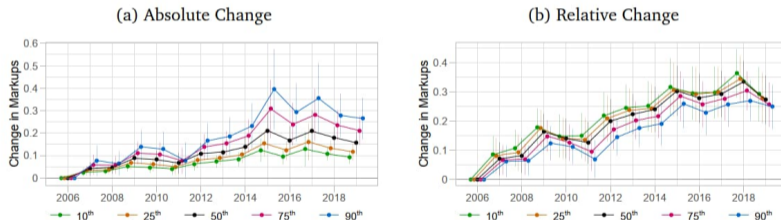
Figure 3

Figure 3: Markups Over Time Across Product Categories

Notes: This figure plots the mean of within-category median markups over time. Markups are defined by the Lerner index, $(p - mc)/p$, and are estimated separately by product category and year. When calculating the mean, we winsorize the upper and lower 2.5 percent of observations across all categories and years.
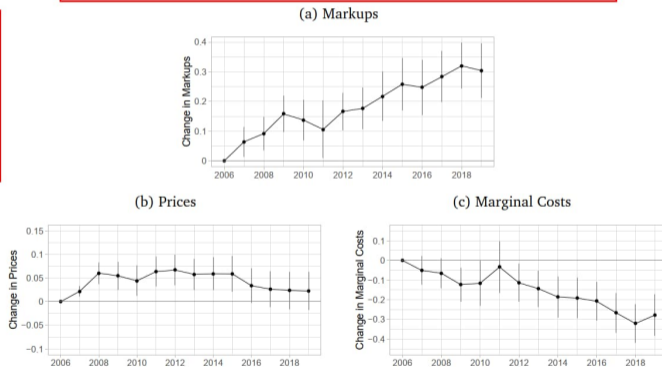
Figure 4

Figure 4: Changes in the Distribution of Markups

(a) Absolute Change

(b) Relative Change

Notes: This figure shows coefficients and 95 percent confidence intervals of regressions of percentiles of the markup distribution at the product category level on year dummies using the year 2006 as the base category. In panel (a), outcomes are percentiles of the level of the Lerner index, $(p - c)/p$, in panel (b), outcomes are measured in logarithms.
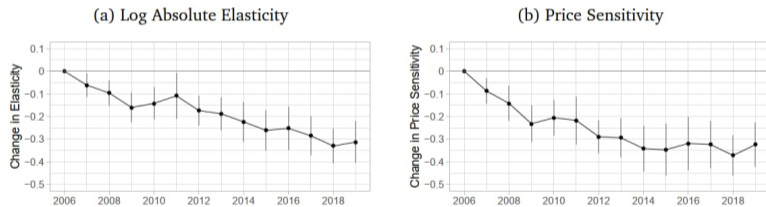
Figure 5

Figure 5: Product-Level Changes in Markups, Prices, and Marginal Costs

(a) Markups

(b) Prices

(c) Marginal Costs

Notes: This figure shows coefficients and 95 percent confidence intervals of a regressions of the log of the Lerner index, real prices, and real marginal costs at the product-chain-DMA-quarter-year level on year dummies controlling for product-chain-DMA and quarter fixed effects. The year 2006 is the base category.

Figure 6

Figure 6: Changes in Demand

(a) Log Absolute Elasticity   (b) Price Sensitivity

Notes: This figure shows coefficients and 95 percent confidence intervals of a regression of log absolute elasticity and price sensitivity at the product-chain-DMA-quarter-year level on year dummies controlling for product-chain-DMA and quarter fixed effects. The year 2006 is the base category.

Table 3

Table 3

Table 3: Factors Predicting Cross-Category Variation in Markup Trends

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Marginal Cost (Standardized)	-0.564^{***} (0.024)					-0.450^{***} (0.023)	-0.449^{***} (0.023)
Price Sensitivity		-0.721^{***} (0.030)				-0.392^{***} (0.022)	-0.393^{***} (0.022)
Quality (Standardized)			-0.142^{***} (0.022)			0.006 (0.006)	0.007 (0.006)
Income (Log)				0.052^{**} (0.025)		0.059^{***} (0.013)	0.058^{***} (0.013)
Children at Home				-0.175^{***} (0.064)		-0.076^{***} (0.026)	-0.083^{***} (0.027)
Parent HHI					0.236 (0.186)		0.236^{***} (0.046)
Brand HHI					0.091 (0.178)		-0.097^{**} (0.048)
Retailer HHI					0.203^{***} (0.077)		0.074^{***} (0.025)
Brand-Category-DMA-Retailer FEs	X	X	X	X	X	X	X
Time Period FEs	X	X	X	X	X	X	X
Observations	14,407,410	14,407,410	14,407,410	14,407,410	14,407,353	14,407,410	14,407,353
R^2 (Within)	0.719	0.468	0.047	0.000	0.003	0.826	0.827

Notes: This table reports regression results where the dependent variable is log markups. Observations are at the brand-category-DMA-retailer-year-quarter level, and brand-category-DMA-retailer and year-quarter fixed effects are included in each specification. Standard errors are clustered at the category level and are reported in parentheses. $^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$.

Figure 7

Figure 7: Simulated Markup Changes
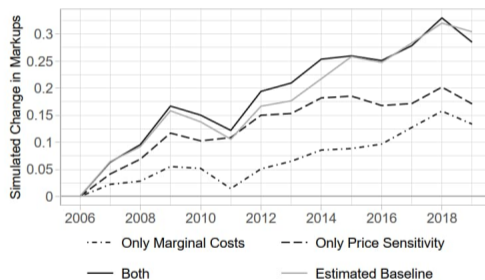
Notes: This figure plots counterfactual log changes in markups from simulations that scale marginal costs (dash-dotted line), price sensitivities (dashed line), or both (solid line) according to the average realized changes that are reported in Figures 5 and 6. Markups are defined by the Lerner index, $(p - mc)/p$, and changes are reported relative to 2006. Product assortments, consumer demographics, and other demand parameters are held fixed at 2006 values in each simulated year. The solid gray line plots the estimated change in log markups in the realized data for comparison.

Table 4

Table 4: Price Sensitivity and Markups Across Product Categories

	(1) 2006 Log $\overline{L}$	(2) 2017 Log $\overline{L}$	(3) 2019 Log $\overline{L}$	(4) Δ Log $\overline{L}$
Price Sensitivity	-0.134^{***}	-0.200^{***}	-0.090^{***}	
	(0.027)	(0.029)	(0.029)	
Δ Price Sensitivity				-0.575^{***}
				(0.012)
Observations	133	133	133	1,729
R^2	0.162	0.268	0.070	0.571

Notes: This table reports regression results that examine the cross-sectional and time series relationships of price sensitivity and markups, as measured by the log aggregate Lerner index at the category-year level. All regressions include a constant. Columns (1), (2), and (3) capture cross-sectional variation using the years 2006, 2017, and 2019 for the 133 product categories in our baseline sample. Column (4) captures the time series variation by estimating the model in first differences from 2007 through 2019. The regressions are motivated by the decomposition in equation (12). Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
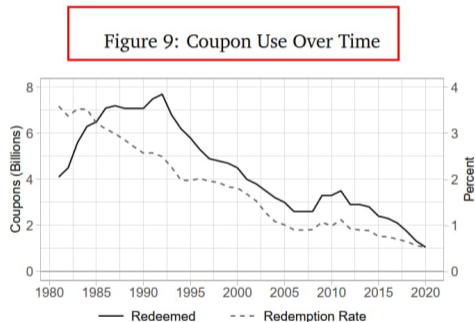
Figure 8

Figure 8: Decomposition of Markup Trends
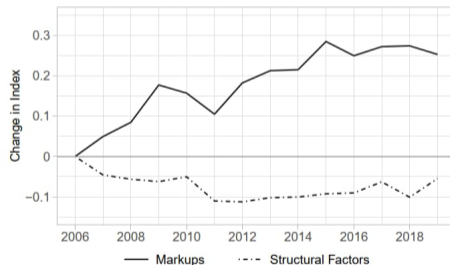
Notes: This figure shows the changes to the aggregate log Lerner Index (black line) and the structural factors (dash-dotted line) specified by equation (12). The structural factors incorporate observable changes in prices and the distribution of market shares. The difference between the two lines is captured by changes to price sensitivity.

Figure 9

Figure 9: Coupon Use Over Time

Notes: This figure shows the annual number of coupons redeemed (left axis) and the redemption rate out of all issued coupons (right axis). From 2006 to 2019, coupon redemptions fell from 2.6 billion to 1.3 billion, and the redemption rate fell from 0.90 percent to 0.56 percent. Annual estimates reflect total coupon usage for consumer products in the United States across all channels, including free standing inserts and electronic coupons.

Table 5

Table 5: Annual Surplus and Welfare Per Capita

(a) 2006 Preferences and Costs

Specification	CS	PS	W	% change CS	% change W
Baseline	628	261	889	0.0	0.0
Prices Scaled to 2019 Levels	603	263	867	-3.8	-2.4
Markups Scaled to 2019 Levels	551	267	818	-12.2	-8.0
Prices Equal to Marginal Costs	956	0	956	52.4	7.6

(b) 2019 Preferences and Costs

Specification	CS	PS	W	% change CS	% change W
Baseline	974	371	1345	0.0	0.0
Prices Scaled to 2006 Levels	1006	350	1356	3.3	0.8
Markups Scaled to 2006 Levels	1106	280	1386	13.5	3.1
Prices Equal to Marginal Costs	1460	0	1460	49.9	8.6

Notes: This table reports consumer surplus (CS), producer surplus (PS), and welfare (W) per capita based on estimated demand parameters ("Baseline") and for counterfactual scenarios that hold fixed preferences and marginal costs and vary the price levels.

Figure 10

Figure 10: Consumer Surplus Over Time By Income Group
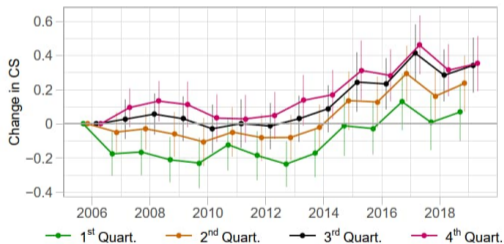
Notes: This figure reports coefficients and 95 percent confidence intervals of a regression of the log of consumer surplus by purchase on year dummies, controlling for category fixed effects, separately for different quartiles of the income distribution.