Definition of relevant market in beer industry:
Application of LA-AIDS model

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Outline

Motivation

- Market definition - first step in market power assessment or in investigating the intensity of market competition.

Why beer industry?

- permanent growth in market concentration during last decades, primarily due to mergers
- the relevant market considered beer in nearly all market decision in beer brewing industry

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Model
Estimation/Results
Summary

Data
Model specification

Procedure

- 2-stage demand estimation
- Critical Loss Analysis
- SSNIP test and on its basis definition of relevant markets

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Data

- Panel scanner data from Dominick's Finer Food company (36 stores in Chicago metropolitan area)
- Weekly data from June 91 to November 95 (220 observation)
- Detrended and seasonally adjusted (temperature,holidays)

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Model overview

- Multi-stage budgeting, 2 levels (+ more efficient estimates; - weak separability assumption)
- Beer brands divided into 6 segments: Premium, Light, Craft, Imported, Dark, Non-alcoholic; each containing 3-5 beer brands
- Linear approximation of Almost Ideal Demand System

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LA-AIDS specification

Bottom level (within segment):

$$w_{int} = \alpha_{in} + \beta_i \ln(Y_{mnt}/P_{mnt}) + \sum_{j=1}^{I} \gamma_{ij} \ln p_{jnt} + \epsilon_{int}, \qquad (1)$$

Lagged Stone index (+ avoid simultaneity bias)

$$\ln P_{mnt} = \sum_{i=1}^{I} w_{in(t-1)} \ln p_{int}. \qquad (2)$$

Upper level (between segment):

$$w_{mnt} = \alpha_{mn} + \beta_m \ln(Y_{bnt}/P_{bnt}) + \sum_{k=1}^{M} \gamma_{mk} \ln P_{knt} + \epsilon_{mnt}, \qquad (3)$$

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Estimation

- SUR-GLS fixed effect estimator (capture covariances of error terms,between data variability very low)
- Haussman test in most cases suggests endogeneity, but we didn't use IV estimator ("weak instruments",price setting independent to demand shocks)

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CLA

First version:

- CLA calculates the level of sales, that a hypothetical monopolist could lose due to a 5-10 % price increase in order to preserve at least the level of profit before the price increase
- Break-even critical demand elasticity:Price elasticity of demand, under which the original level of profit is equal to the level of profit after the SSNIP

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CLA cont.

Second version:

- Profit maximizing CLA calculates the level of sales, that a hypothetical monopolist could lose due to 5-10 % price increase in order to achieve a profit-maximizing price
- Critical demand elasticity is equal to the elasticity of demand, under which the hypothetical monopolist would increase its price by at least 5-10 % in order to set its price on profit-maximizing level

Evaluation:

- $\varepsilon > \varepsilon_{c,be}$, then the set of products does not constitute a relevant market rendering the SSNIP not profitable.
- $\varepsilon < \varepsilon_{c,be}$, the tested set of products is the relevant market.

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Bottom level results

Segment	Brand	Elasticity	Standard Error	Conditional elasticity
Premium	Budweiser	-4.285	0.128	-4.162
	Old Style Regular	-3.194	0.131	-3.145
	Miller Genuine Draft	-3.363	0.037	-2.920
	Miller General Draft	-3.467	0.036	-3.057
Light	Amstel	-2.998	0.197	-2.929
	Michelob	-2.377	0.102	-2.207
	Coors Regular	-2.434	0.132	-2.282
	Miller	-2.197	0.055	-1.417
Dark	Augsburger	-2.678	0.095	-2.438
	Berghoff	-2.221	0.073	-1.858
	Becks	-2.976	0.139	-2.706
	Lowenbrau	-1.472	0.136	-1.358
	Killians Irish Red	-3.153	0.121	-2.687

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Bottom level - results cont.

Imported	Heineken	-4.046	0.075	-3.773
	Becks Regular	-4.907	0.075	-4.672
	Molson Golden	-3.054	0.058	-2.947
	Moosehead	-3.237	0.059	-3.106
Craft	Augsburger Regular	-2.849	0.054	-2.523
	Berghoff Regular	-2.409	0.040	-2.009
	Leinenkugel Premium Regular	-2.038	0.074	-1.833
	Samuel Adams Lager	-5.069	0.135	-4.840
Non-alcoholic	Coors Cutter	-0.750	0.112	-0.895
	Miller Sharps	-1.784	0.035	-1.057
	Odouls	-2.524	0.066	-2.025

Table: Overall own price elasticities

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Bottom level - result evaluation

- All own-price elasticity falls in (-4,-2), only non-alcoholic beers inelastic demand
- The most elastic ones: premium, imported
- The least elastic ones: non-alcoholic, dark

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Upper (segment) level

	Premium	**Light**	**Dark**	**Imported**	**Non-alc.**	**Craft**
$\ln(Y/P)$	-0.006*	0.004*	0.006*	-0.004*	0.009*	0.010*
$\ln(P_{\text{Premium}})$	-0.102*	0.050*	0.007*	0.010*	0.002	0.033*
$\varepsilon_{\text{Premium}}$	-1.218	0.110	0.017	0.024	0.005	0.074
$\ln(P_{\text{Light}})$	0.050*	-0.115*	0.016*	0.028*	-0.013*	0.034*
$\varepsilon_{\text{Light}}$	0.374	-1.902	0.125	0.213	-0.105	0.266
$\ln(P_{\text{Dark}})$	0.007*	0.016*	0.017*	-0.007*	-0.002	-0.032*
$\varepsilon_{\text{Dark}}$	0.062	0.222	-0.760	-0.113	-0.039	-0.465
$\ln(P_{\text{Imported}})$	0.010*	0.028*	-0.007*	-0.004	-0.012*	-0.015*
$\varepsilon_{\text{Imported}}$	0.097	0.222	-0.053	-1.028	-0.091	-0.112
$\ln(P_{\text{Non-alc.}})$	0.002	-0.013*	-0.002	-0.012*	0.028*	-0.003
$\varepsilon_{\text{Non-alc.}}$	-0.024	-0.134	-0.025	-0.125	-0.747	-0.034
$\ln(P_{\text{Craft}})$	0.033*	0.034*	-0.032*	-0.015*	-0.003	-0.019*
$\varepsilon_{\text{Craft}}$	0.254	0.295	-0.288	-0.142	-0.032	-1.176
Constant	0.167*	0.167*	0.167*	0.167*	0.167*	0.167*
s.d.	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)

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Upper level - result evaluation

- Size of elasticities in line with bottom level: higher for premium light segment, lower for non-alc. and dark segment
- Interesting result: negative cross-price elasticities with non-alc. beer segment
- Results of SSNIP

			SSNIP = 0.05		**SSNIP = 0.1**	
	m	ε	$\varepsilon_{c,be}$	$\varepsilon_{c,pm}$	$\varepsilon_{c,be}$	$\varepsilon_{c,pm}$
Premium	0.175	1.218	4.45	3.64	3.64	2.67
Light	0.161	1.902	4.74	3.83	3.83	2.77
Dark	0.108	0.760	6.31	4.80	4.80	3.24
Imported	0.084	1.028	7.47	5.44	5.44	3.52
Non-alcoholic	0.185	0.747	4.26	3.51	3.51	2.60
Craft	0.150	1.176	5.00	4.00	4.00	2.86

Relevant market isn't larger than segment

Summary

- Hypothetical monopolist over any one of our proposed segments would have enough market power to implement the SSNIP, making *each* of the analysed segments a *separate relevant market*.
- Competition concern might be focused on the certain segment not on all of beer.
- Limitation:
    - credibility/reliability of segment classification
    - we analyse only demand side substitution of the market (what about supply-side substitution ?)

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