



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Consumer Response to Package Downsizing: An Application to the Chicago Ice Cream Market

Metin Cakir¹ and Joseph V. Balagtas²

1. Dept. of Bioresource Policy, Business, and Economics, University of Saskatchewan 2. Dept. of Agricultural Economics, Purdue University

Introduction

- Package downsizing is the practice of reducing the volume of product per package such that the new size replaces the old one.
- Downsizing is commonly observed in U.S. consumer goods markets, and has been especially common in food manufacturing.



- Objective:** To provide empirical evidence on the economic reasons and consequences of downsizing.

Research Questions

- What is the consumer response to downsizing?
- How does it compare to the consumer response to price changes?

The US Bulk Ice Cream Industry

Brand	1998	2004	2007
	Size (Oz.)		
NB 1	64.00	56.00	54.83
NB 2	64.00	56.23	56.00
SB 1	64.00	62.62	60.47
NB 3	64.00	56.11	56.00
NB 4	64.00	64.00	64.00
SB 2	64.00	64.00	56.00
NB 5	64.00	61.35	58.67
NB 6	64.00	56.00	56.00
NB 7	64.00	57.67	57.97
NB 8	64.00	63.45	61.78

NB = National Brand
SB = Store Brand
Source: Nielsen Homescan

Year	National Brand 1			National Brand 2		
	Price per Package (dollars)	Price per Oz. (dollars)	Size (Oz.)	Price per Package (dollars)	Price per Oz. (dollars)	Size (Oz.)
2000	3.330	0.053	62.45	3.451	0.054	64.00
2001	3.345	0.054	63.70	3.520	0.055	63.49
2002	3.200	0.056	57.02	3.451	0.056	61.33
2003	3.208	0.056	57.24	3.469	0.061	56.59
2004	3.375	0.060	56.00	3.353	0.060	56.23

Source: Nielsen Homescan

The Data

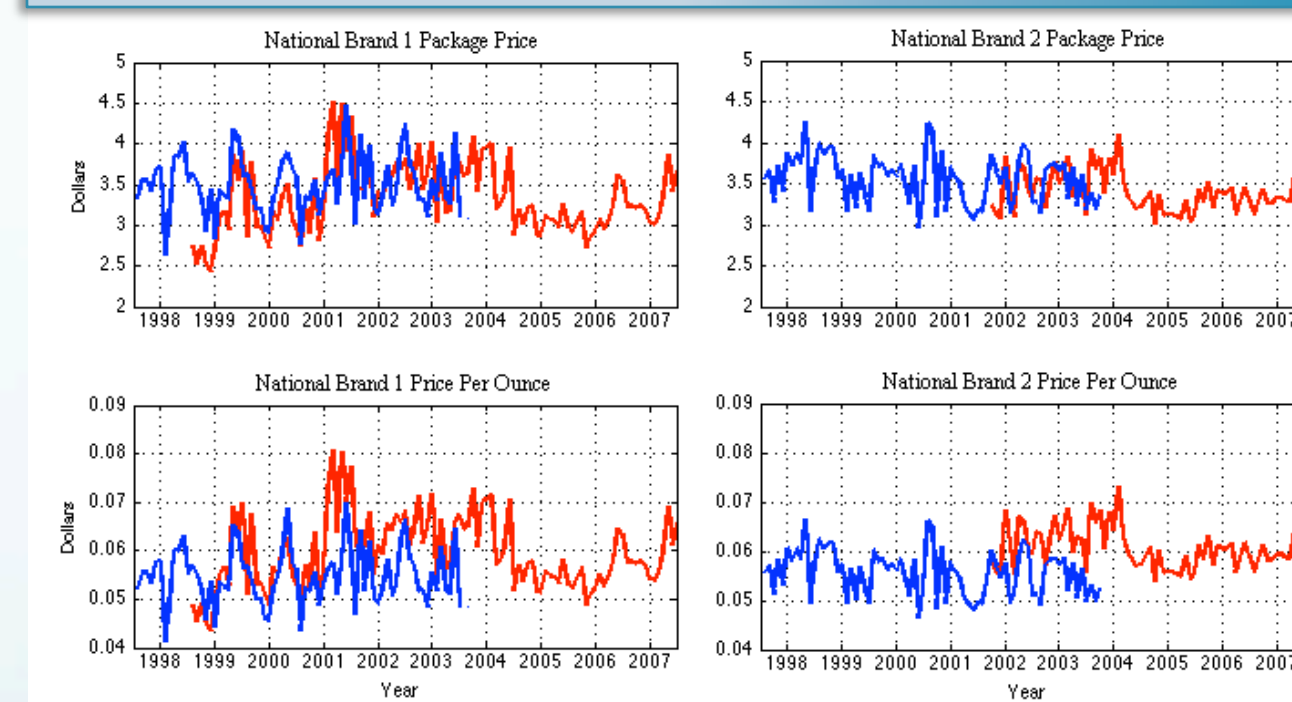
- A panel of households on half gallon ice cream purchases in Chicago, 1998-2007, provided by Nielsen Homescan.
- Four major brands: Three national brands, one store brand
- Information on price, package size, promotion and household demographics.

Descriptive Statistics				
Brand	Choice Share	Price (Dollars)	Package Size (1/2 gal.)	Promotion (Percentage)
National Brand 1	0.26	3.36	0.91	76
National Brand 2	0.23	3.44	0.92	79
Store Brand 2	0.04	3.17	0.96	75
National Brand 8	0.17	3.10	0.99	80

Source: Nielsen Homescan



The Package and Unit Price Trends of Top Two Brands in Chicago, 1998-2007



The Econometric Model

- A simultaneous demand and supply model of market with differentiated products.
 - Demand: random coefficient logit
 - Supply: reduced form
- The model incorporates consumer heterogeneity, controls for price endogeneity, and copes with unbalanced panel nature of data.
- Estimation:** We adapt a Bayesian approach for estimation.

Results

- Average price elasticity of bulk ice cream demand is -0.5
- Average package size elasticity is 0.12
- Store brand's pricing affects national brands' demand considerably less than the effect of national brands' pricing on store brand's demand.
- In the event of downsizing households switch more heavily to larger products.
- Households sensitivity to price and package size changes varies by demographics
 - Smaller households, households with higher income and education are less sensitive to price changes
 - Households with an employed household head are less sensitive to package size changes

Posterior Mean and (SD) of Price Elasticities

	N. Brand 1	N. Brand 2	S. Brand 2	N. Brand 8
N. Brand 1	-0.497 (0.150)	0.231 (0.086)	0.028 (0.008)	0.237 (0.063)
N. Brand 2	0.225 (0.091)	-0.448 (0.152)	0.025 (0.009)	0.197 (0.059)
S. Brand 2	0.189 (0.055)	0.169 (0.052)	-0.519 (0.134)	0.160 (0.043)
N. Brand 8	0.312 (0.081)	0.273 (0.069)	0.029 (0.008)	-0.615 (0.152)

Posterior Mean and (SD) of Package Size Elasticities

	N. Brand 1	N. Brand 2	S. Brand 2	N. Brand 8
N. Brand 1	0.108 (0.011)	-0.054 (0.015)	-0.006 (0.002)	-0.048 (0.013)
N. Brand 2	-0.058 (0.005)	0.110 (0.009)	-0.007 (0.002)	-0.045 (0.014)
S. Brand 2	-0.040 (0.014)	-0.042 (0.015)	0.121 (0.025)	-0.039 (0.014)
N. Brand 8	-0.076 (0.015)	-0.065 (0.015)	-0.008 (0.002)	0.149 (0.012)

Conclusion

- Typical of oligopolistic differentiated product markets.
 - Top 6 brands account for the half market.
 - Downsizing is frequently observed.
 - Unit price changes with downsizing.

- Consumers are less responsive to package size than to package price: the demand elasticity with respect to package size is approximately one-fourth of the magnitude of the demand elasticity with respect to price.
- Manufacturers can use downsizing as a hidden price increase in order to pass through increases in production costs, i.e., cost of raw materials, and maintain or increase their profits.