The Effect of Income on Private-Label Demand for Fluid Milk in the United States

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BACKGROUND

The large growth of private labeling in the last decades has become a concern for national brand manufacturers. This growth was even bigger during the Great Recession. The private label products are categorized as inferior goods. Among all product, fluid milk is the only product for which share the of private label (78%) is bigger than national brands, while the average share of private label in food products is about 20%. In fact, some people who prefer national brands in general buy private label fluid milk. Therefore, one can claim that it is likely that fluid milk violates the general rule of private label products as inferior goods.

OBJECTIVE

To examine the causal effect of household-level income and Great Recession affecting private label demand of different package sizes of fluid milk

DATA

We use the Nielsen Company's household-based scanner data as our primary data source, which include samples of more than 40,000 nationally representative households (e.g., in terms of gender) in 52 U.S. markets and the nine remaining U.S. areas..

### Summary Statistics of the Private Label Share, Per Unit Price and Household's Income from 2004 to 2012.

	Variable	Obs.	Mean	S.D.	Min	Max
1gallon	Share	1,519,882	0.84	0.34	0.00	1.00
	Income	1,519,882	56,781	28,432	5,000	100,000
	Price	1,519,882	2.95	0.73	0.54	13.79
0.5 gallon	Share	917,020	0.71	0.44	0.00	1.00
	Income	917,020	56,128	28,726	5,000	100,000
	Price	917,020	2.18	0.89	0.51	14.28
0.25 gallon	Share	138,493	0.51	0.49	0.00	1.00
	Income	138,493	55,235	29,133	5,000	100,000
	Price	138,493	1.51	0.49	0.50	6.99

MODEL

$$s_{hmt} = \beta_0 + \beta_1 \log(I_{ht}) + \beta_2 R + \beta_3 PR + u_h + \tau_m + \varphi_s + e_{hmt}$$

where s_{hmt} is private label expenditure share for household h in month m in year t which is calculated through equation (1), I_{ht} is the income of household h in year t, R is the dummy variable equal to one for the recession period (December 2007- June 2009), PR is the dummy variable equal to one for the post-recession period (July 2009-December 2012), u_h is households fixed effects (household size, race, employment, marital status, and education level), τ_m is monthly fixed effects, φ_s indicate states fixed effects, and e_{hmt} captures all unobservable effecting the dependent variable.

Average Price of Private Label and National Brands from 2004 to 2014

RESULTS and CONCLUSION

Panel Logit Regression Result of Marginal Effects of Private Label Share
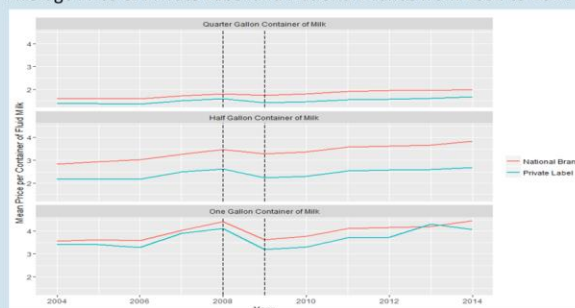
	0.25	0.5	1	Fluid milk in general
Log (Income)	-0.015***	-0.004	-0.006	-0.004
	(0.005)	(0.005)	(0.005)	(0.003)
Recession	0.022*	0.072***	0.112***	0.087***
	(0.013)	(0.004)	(0.003)	(0.003)
Post-Recession	0.029*	0.125***	0.159***	0.127***
	(0.017)	(0.005)	(0.011)	(0.004)
HH Controls	NO	NO	NO	NO
Product Type Controls	YES	YES	YES	YES
Household Fixed Effects	YES	YES	YES	YES
Month Fixed Effects	YES	YES	YES	YES
State Fixed Effects	49,548	484,506	735,753	1,276,736
Observations	3,883	22,066	22,840	35,173

Notes: Household level control variables includes: household size, race, employment, marital status, education level. Product type controls includes container type (plastic, glass, and other types), organic label, and deal flag. Huber- White standard errors are reported in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

- The effect of income on private label share of fluid milk is heterogeneous among different package sizes of fluid milk (e.g. 0.25, 0.5, and 1 gallon).
- The effect of income for 0.25-gallon private label share is negatively significant; however, the effect of income for 0.5-gallon, 1-gallon, and fluid milk in general is not statistically significant.
- Positive effect of recession and post-recession on private label share for all three package sizes. Interestingly, the positive effect of post-recession is even bigger than the recession.
- Stores that serve primarily lower-income shoppers benefit more from 0.25-gallon private label fluid milk than those with mainly higher-income shoppers.

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