

U.S. Consumer Demand for Differentiated Eggs

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Introduction

- The Prevention of Farm Animal Cruelty Act, which bans eggs from the battery cage system, was passed in California in 2008 and will be effective in January 2015. Similar regulations were passed in Michigan in 2009 and are under discussion in several other states. Even a federal law to improve the lives of egg-laying hens has been proposed. The regulations may cause a shift in egg demand towards certain kinds of eggs.
- The egg market is currently differentiated by production management practices. In the rapidly growing specialty egg market, organic eggs are the fastest growing segment. In addition to the animal welfare provisions, organic eggs also meet other standards such as being free of antibiotics. Organic egg sales grew at an average annual rate of 19 percent between 2000 and 2005, and reached \$161 million in 2005 (Oberholtzer, Green, and Lopez 2006).
- The U.S. egg market is also differentiated by brands. The conventional egg market is characterized by the domination of private labels over national brands, and eggs are the second biggest private label item in the supermarket (Oberholtzer, Green, and Lopez 2006). Private labeling of organic eggs is also growing.
- The economic consequences of the regulations is determined by their effects on both supply and demand for eggs. However, the U.S. consumer demand for differentiated eggs products is not well studied.

Objectives

- Analyze the current U.S. consumer demand for egg products differentiated by production practices and by brand types.
- Examine hypotheses regarding how U.S. consumers choose eggs among products differentiated by production practices and by brand types.

Literature

- There are a limited number of studies on U.S. demand for eggs. The majority of previous studies on egg demand examined the European and Canadian markets.
- A few studies used stated preference methods, including surveys and experiments, and found consumer preferences towards animal welfare-related characteristics.
- Studies using revealed preferences data obtained inconclusive results. A low willingness to pay for organic eggs was found among most U.S. shoppers from a hedonic analysis (Chang, Lusk, and Norwood 2010), while U.S. consumers in five east coast cities were found to be willing to pay significant premiums for organic eggs (Satimanon and Weatherspoon 2010).
- Lusk (2010) found the demand for organic eggs was price elastic in *San Francisco/Oakland* but less elastic than demand in *Dallas/Ft. Worth*.

Method

- A first-difference Almost Ideal Demand System for egg products differentiated by production methods and brand types was specified:

$$W_{it} = \alpha_i + \sum_{j=1}^n \gamma_{ij} \log P_{jt} + \beta_i \log \left(\frac{X_t}{P_t} \right) + \delta_i T_{it} + \varepsilon_{it}$$

- Weak separability between products by production practices and brands were tested using an adjusted Wald test.

Hypothesis 1: Consumers first choose eggs by the production practices and then by the brand types.

Hypothesis 2: Consumers first choose eggs by the brand types and then by the production practices.

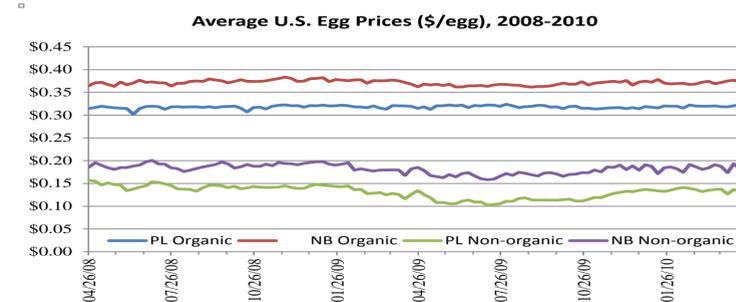
Data

- National weekly scanner data from AC Nielsen over the time period from 2008 to 2010.
- Despite the rapid growth, the market share of organic eggs remained still small.
- Private-labeled (PL_) products dominated the non-organic egg market. Almost 47% of the organic eggs were sold under private labels although organic eggs had historically been sold under national brands (NB).

Table 1. Average Market Share and Market Price by Production Practice and Brand

	Share (%)	Price (\$/Egg)
Private Labeled Organic Eggs (PL OG)	2.95%	0.32
National Branded Organic Eggs (NB OG)	3.35%	0.37
Private Labeled Non-organic Eggs (PL NOG)	62.91%	0.13
National Branded Non-organic Eggs (NB NOG)	30.79%	0.18

- The prices of organic eggs were significantly higher than the prices of non-organic eggs.
- The prices of national branded eggs were statistically higher than the private labeled eggs and the premium was about the same among organic and non-organic eggs.



Results

- Organic eggs were no longer a luxury item but a necessity for an average consumer during the sample period.
- Demand for all egg products was own-price elastic except for private-labeled conventional eggs. The quantity demanded for national-branded eggs was more responsive to price changes than private-labeled eggs. Income played a relatively more important role in the demand for non-organic private-labeled eggs.

Table 2. Estimated Expenditure and Own-Price Elasticities

	PL OG	NB OG	PL NOB	NB NOG
Expenditure	0.62	0.71	1.10	0.87
Compensated Own-Price	-1.25	-1.54	-0.68	-1.31
Uncompensated Own Price	-1.27	-1.57	-1.37	-1.58

- For both organic and non-organic egg products, NB and PL eggs were shown to be substitutes for each other.
- The demand for non-organic eggs was not responsive to the changes in price of organic eggs.
- An increase in the price of non-organic eggs would result in a rise in the demand for organic eggs.

Table 3. Uncompensated Cross-price Elasticities

	PL OG	NB OG	PL NOB	NB NOG
PL OG	-1.271***	0.276**	0.312***	0.060
NB OG	0.241**	-1.568***	0.317***	0.299***
PL NOG	0.001	0.004	-1.367***	0.263***
NB NOG	-0.001	0.027**	0.684***	-1.575***

- The weak separability hypotheses were rejected, indicating consumers simultaneously chose eggs using both attributes: production practices and brand types.

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