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# Promotion in the Marketing Mix: What Works, Where and Why

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# THE EFFECTS OF PROMOTION ON THE DEMAND FOR SPECIALTY PRODUCTS AND THEIR MASS MARKET COUNTERPARTS: An Econometric Analysis of the Canadian and U.S. Maple Syrup Markets

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## Introduction

Given the adverse economic conditions in agriculture, many farmers have turned to the production and marketing of specialty crops and food products to supplement and/or replace their farm income from traditional sources. Though these producers are finding that the marketing of such specialty products gives them access to potentially highly profitable markets, the actual profitability of these markets depends in large part on the marketers' ability to make optimal pricing and promotion decisions. However, much of the information necessary to make these decisions is nonexistent.

The quote from a 1968 report, "...statistics on the specialty crops industries are meager" (Powell et al. 1968), still holds today. Reasons cited include the fact that production is often highly specialized, taking place on small acreage, and that marketing is highly diversified (Powell et al. 1968). Yet, more recent studies have suggested that agricultural specialty foods will fill a market niche and should be profitable (Kline 1986; Skenazy 1988; Homestead Design 1989). Vermont alone reports between $400 and $500 million dollars in sales from specialty food products, up from a fledgling industry just ten years ago (Barna 1993). Despite their growth in the marketplace, very little is known about the demand characteristics of these products. In particular, marketers lack information concerning how consumers respond to price changes and promotional activities of not only specialty products, but their mass market counterparts.

This paper seeks to analyze consumer responsiveness to factors related to the sale of specialty food products and their mass market counterparts by specifically analyzing the pure and imitation, or nonpure maple syrup market. This study uses a pooled cross-section and time-series data set, collected from four cities in the northeastern United States and two provinces in Canada. Generalized Least Squares Regression is employed to estimate promotion, price, and income elasticities.

There are several reasons why maple syrup was chosen as the specialty food for this study. First, pure maple syrup became one of America's first specialty products with the advent of maple imitations which were developed in the early 20th century. Second, maple syrup has a place in a firmly established market. During the past three years alone,

U.S. production of pure maple syrup has had an average value of over $33,500,000, while Canada's production value averaged over $54,000,000 (Sendak 1993). Knowledge gained about this established specialty product may be transferrable to other products in the development or introductory stages of their product lifecycles. Third, there is a clear substitute for pure maple syrup in the marketplace, allowing the comparison of consumer reactions to factors affecting demand between a specialty product and its mass market (in this case, imitation) counterpart.

## Literature Review

With respect to demand analysis of specialty products and their mass market counterparts, no research has been conducted. In fact, little research has been conducted on specialty products or crops in general. With respect to the maple syrup industry in particular, there have been no quantitative studies of consumer responsiveness to promotional activities or to prices. Maple syrup research has focused primarily on the production and processing of maple syrup (Taylor and Pasto 1970; Sendak and Jenkins 1982; Sendak and Bennink 1985; Allbee 1991; Hinrichs 1992). The small body of literature which does focus on the demand side of the marketplace is descriptive in nature, quite dated, and essentially void of any economic analysis (Sendak 1974; Agriculture Quebec 1975; Sendak 1978; Sendak 1982; Sendak and Jenkins 1982; Sawyer, Worthington and Sendak 1979). Much of this literature involves surveying consumers to discern their preferences for pure versus non-pure syrup as well as various grades of pure maple syrup and to define their purchasing patterns (Agriculture Quebec 1975; Whalen and Morselli 1982; Tardiff 1988; Drake and James 1991; HM 1991; Hinrichs 1992).

Sendak (1974) surveyed maple syrup consumers by telephone in 15 small, medium, and large cities in the United States and Canada in 1972. Because most of the U.S. maple syrup is produced in the Northeast, this area was more heavily sampled. Findings indicated that over 50% of the consumers surveyed ranked unique flavor, being a natural food item, being available year round, and convenience of purchase very important characteristics of maple syrup. Eighty-one percent of consumers indicated that pure maple syrup tasted better than any other syrup or topping. However, only 25% of those living in maple producing regions and 20% of those living in other regions used pure maple syrup exclusively. Non-pure or maple flavored syrups were used by about 60% of respondents. Whalen and Morselli (1982) found that consumers have no preference for a particular grade of syrup. Using many of the same criteria as Sendak (1974), Consumer Reports (1991) found pure maple syrup to be of consistently higher quality than imitation maple syrup in every respect.

Sendak (1978) studied consumers in non-maple producing regions with respect to preferences for graded syrup. Results indicated that an individual's perception is not sharp enough to detect the difference between pure and non-pure maple products, and the products did not differ in the quality judged. However, the consumers in maple producing regions were able, with ease, to tell the difference between the pure and non-pure product. A more recent study (Sendak 1982), however, concluded that consumers interviewed in non-maple producing regions perceived a brand of nonpure syrup to be pure in 56% of the cases.

Taylor and Pasto (1970) found that in 1964, 50% of maple syrup produced was sold by 77% of sugarbush operators from their own home, while only 5% of production was sold in consumer packages to other retail stores by 11% of producers. Thus, in 1964, producer sales of packaged syrup to retailers was found to be the least important in terms of volume (Taylor and Pasto 1970).

By 1972, however, these statistics had changed. Sendak (1974) concluded that in 1972, the most promising outlet for maple syrup sales was the supermarket, although roadside stands and mail-order catalogs should not be overlooked. About one quarter of maple syrup consumers in maple producing regions purchased maple syrup at a supermarket, while 60% purchased syrup from roadside stands. In contrast, consumers in non-maple producing regions purchased syrup in supermarkets 68% of the time, while purchases at road side stands stood at about 9%. Tardiff (1988) indicates that supermarkets are an interesting market to get into for pure maple syrup products, but they may not necessarily be profitable or easy to enter.

With respect to promotion decisions, Taylor and Pasto (1970) found that in 1964, 26% of maple procurers said they promoted or advertised their products, varying from 18% in the smallest-sized group with production of less than 200 gallons, to 54% in the largest-sized group, with production of 800 or more gallons. Since this study, Sawyer et al. (1979) found that providing product information comparing pure versus non pure syrup ingredients increased the purchase rate of pure maple syrup by over 90%. With the exception of these two studies, there have been no formal analyses of the effects of promotion on maple syrup sales.

In summary, there has been limited research focusing on demand analysis of specialty products, despite significant growth in consumption of these products in recent years. For maple syrup in particular, no quantitative studies have been conducted which examine the effects of price and promotion. This study seeks to fill this void.

## Model Specification and Estimation

### *Theoretical Framework*

The model is based on classical microeconomic theory, where the quantity of brand i maple syrup demanded in time period $t$ $(Qd_{it})$ is a function of the price of maple syrup $(P_{it})$, the price of related goods $(Pr_{it})$, per capita income $(I_{it})$, a dummy variable for syrup brand $(D_{it})$, and other exogenous variables affecting demand $(V_{it})$ including retailer promotion activity of pure and nonpure maple syrup . That is:

$$Qd_{it} = f(P_{it}, Pr_{it}, I_{it}, D_{it}, V_{it}).$$

We can state the above function in matrix notation as:

$$Qd_{it} = BX_{it} + \varepsilon_{it}$$

where $X_{it}$ is a vector of the variables influencing the demand for maple syrup as indicated above, B is a vector of coefficients conformable to the dimension of $X_{it}$, and $\varepsilon_{it}$ is a random error term which is assumed to be time-wise autoregressive.

Elasticities generated from the results can be used to examine the effects of specific

changes in variables such as prices, income, and promotion efforts, on maple syrup demand. Additionally, syrup brands for which these effects are greatest can be identified.

## *Data*

Infoscan[R] grocery data was purchased for use in estimation from *Information Resources* in Waltham, MA (for U.S. data) and Nielsen Canada (for Canadian data). The data set is a quad weekly time-series over a four year period (1988-91) for four Standard Metropolitan Statistical Areas (SMSAs) in the northeastern region of the United States, and Quebec and Ontario in Canada.

The data include quadweekly prices, quantities, and promotional information for both pure and nonpure (imitation) maple syrup at the brand level. The promotional information is the percent of stores having a particular brand on display or feature. Our analysis focuses on the top five selling brands of both pure and imitation (nonpure) maple syrup in the United States, and the three to four top selling brands in Canada. Thus, in each of four northeastern U.S. SMSAs, we have observations for five brands (for both pure and imitation maple syrup) over 52 quadweekly time periods. For the Canadian areas, we have observations for three to four brands (for both pure and imitation maple syrup) over 33 quadweeks. The purchased data are supplemented by information about per capita income within each SMSA or province for each year.

The definitions of variables used in estimation and descriptive statistics for all of data are provided in tables 1 through 4. All prices and income figures are in terms of 1991 U.S. dollars. Over time, the quantity of pure maple syrup demanded has risen, bucking a ten year U.S. trend of a decrease in consumption of sugars and sweets as a category (Lutz et al. 1993). At the same time, its price has fallen in real terms, in both the U.S. and Canada. For imitation maple syrup (nonmaple), quantity demanded has risen, and the price has risen slightly. Over the time periods, the percent of stores having merchandised pure and imitation maple syrup has been sporadic, ranging from zero to 95% in a given quadweek. Per capita income has declined over the period.

## *Empirical Specification and Estimation*

One maple and one nonmaple (imitation) demand equation of the following form were estimated for each of four SMSAs in the northeastern U.S. (eight equations in total) and two provinces in Canada (six equations total):

$$\begin{aligned} \text{QUANTM} = {} & \alpha_0 + \alpha_1\text{TIME} + \alpha_2\text{PRICEM} + \alpha_3\text{PB1M} + \alpha_4\text{PB2M} + \alpha_5\text{PB3M} \\ & + \alpha_6\text{PB4M} + \alpha_7\text{APRICENM} + \alpha_8\text{MERCHM} + \alpha_9\text{AMERCHNM} \\ & + \alpha_{10}\text{INC} + \text{ERROR} \end{aligned}$$

$$\begin{aligned} \text{QUANTNM} = {} & \beta_0 + \beta_1\text{TIME} + \beta_2\text{PRICENM} + \beta_3\text{PB1NM} + \beta_4\text{PB2NM} + \beta_5\text{B3NM} \\ & + \beta_6\text{B4NM} + \beta_7\text{APRICEM} + \beta_8\text{AMERCHM} + \beta_9\text{MERCHNM} \\ & + \beta_{10}\text{INC} + \text{ERROR} \end{aligned}$$

where

QUANTM = Ounces of brand i pure maple syrup purchased in time period t

QUANTNM = Ounces of brand k non-maple (imitation or nonpure) syrup purchased in time period t

| | | |
|---|---|---|
| PRICEM | = | Price per ounce of brand i pure maple syrup sold in time period t |
| PRICENM | = | Price per ounce of brand k imitation syrup purchased in time period t |
| APRICEM | = | Average price per ounce of top selling pure maple syrup brands in time period t |
| APRICENM | = | Average price per ounce of top selling imitation maple syrup brands in time period t |
| PB1M[1] | = | Brand 1 dummy * price of brand 1 |
| PB2M | = | Brand 2 dummy * price of brand 2 |
| PB3M | = | Brand 3 dummy * price of brand 3 |
| PB4M | = | Brand 4 dummy * price of brand 4 |
| MECHM | = | Percent of stores having brand i maple syrup displayed or featured in time period t |
| MERCHNM | = | Percent of stores having brand k imitation syrup displayed or featured in time period t |
| AMERCHM | = | Average percent of stores having the top selling pure maple syrup brands displayed or featured in time period t |
| AMERCHNM | = | Average percent of stores having the top selling imitation maple syrup brands displayed or featured in time period t |
| INC | = | Per capita income in time period t |
| i = 1,...,5 | | pure maple syrup brands (Note this is the maximum number of brands. Actual number of brands will vary from three in Canada to five in the U.S.) |
| k = 1,...,5 | | imitation maple syrup brands (Note this is the maximum number of brands. Actual number of brands will vary from three and four in Canada to five in the U.S.) |
| t = 1,...,T | | quadweeks (52 for the U.S.; 33 for Canada) |

A double-log form was chosen for estimation, and the estimated coefficients are interpretable directly as elasticities.

Since the disturbance term in a demand equation for syrup in one SMSA or province is likely to be correlated with the disturbance terms in demand equations for syrup in other SMSAs or provinces, and since the disturbances within each equation are not considered to be independent over time, these eight equations were estimated as a system of seemingly unrelated regression equations with autoregressive disturbances, where each equation is a pooling of cross-sections (brands) and time periods (quadweeks). The system can be written as:

$$Q_m = X_m\beta_m + \varepsilon_m,$$

where for the U.S., there are eight equations and each equation has 260 observations (5 brands over 52 time periods), and for Canada, there are six equations and each equation has either 99 or 132 observations.

The assumptions are that the regression disturbances in *different* equations are mutually correlated, and the disturbances *within* the same equation are correlated and follow a first-order autoregressive scheme. In this case a Generalized Least Squares estimation of the system of equations (two-stage Aitken estimator), rather than Ordinary Least Squares estimation of each equation separately, can improve efficiency of the estimates.

Prior to using a the two-stage Aitken estimation procedure, we transformed the original observations using an estimate of the autocorrelation coefficient computed from least-squares residuals.

## Results

In general, the signs of the estimates conform to a priori expectations, and most parameters are significant at the .01 level. Tables 5 through 8 present parameter estimates and their associated t-statistics.

### *Canadian Results*

Own-price elasticities are negative and significant in all cases, as expected. Tables 9 and 10 present preliminary brand level estimates for both Canada and the U.S.. Cross-price elasticity estimates are all insignificant, indicating that Canadian consumers do not perceive pure and imitation maple syrup to be substitutes for each other. Both pure and imitation maple syrup are normal goods. Estimated income elasticities are less than one and significant for nonpure syrup in both provinces and for pure maple syrup in one province, Ontario. In Quebec, the estimated income elasticity is not significantly different from zero. This suggests that in Quebec, consumer demand for pure maple syrup is not affected by changes in income. This is not surprising, given that Quebec is the largest maple producing region in Canada.

With respect to promotional effects, own-merchandising elasticities are positive and significant in both provinces. Thus, increases in the percent of stores merchandising pure (imitation) maple syrup increases consumption of pure (imitation) maple syrup. For example, if the percent of stores promoting pure maple by feature or display in province E increases by ten percent, we would expect maple syrup sales to increase by one percent. Results also indicate that cross merchandising does not affect either pure or imitation syrup sales. All cross-merchandising elasticities are insignificant. In Canada then, merchandising imitation syrup does not increase demand for pure maple syrup and vice vera. This is consistent with the finding that Canadian consumers do not consider the two syrups to be substitutes for one another.

### *United States Results*

Own-price elasticities are negative and significant in all but one case. Results regarding the effects of the price of substitutes (cross-price elasticities) are inconsistent, but the signs are positive where significant. Indications are that the demand for pure

maple syrup is far more responsive to changes in the price of the imitation substitute (two of the four cities have positive and significant cross-price elasticities) than the demand for imitation maple syrup is to changes in the price of pure maple syrup (cross-price elasticity estimates are all insignificant). Thus, pure maple syrup consumers appear to perceive non maple syrup as a substitute, but imitation maple syrup users do not consider pure maple syrup to be a substitute product. Both pure maple syrup and it's mass market counterpart (imitation maple syrup) are normal goods. Estimated income elasticities are less than one and significant.

With respect to promotional effects, results indicate that increases in the percent of stores merchandising pure maple syrup with a display or feature have no effect on the consumption of pure or imitation syrup sales. Unlike in Canada, own-merchandising elasticities for the U.S. are insignificant. Given the relative effectiveness of Canada's promotional efforts, our results suggest it might be useful for U.S. retailers to investigate the nature of these efforts for pure maple syrup.

Interestingly, promoting nonpure (imitation) syrup with display or feature seems to have a significant effect on the demand for nonpure syrup, but also increases sales of the syrup category as a whole. So if the percent of stores promoting nonpure maple syrup with display or feature increases, the demand for pure and nonpure syrup will increase. This result is consistent with the previously mentioned result that consumers of pure maple perceive nonmaple syrup to be a substitute product.

## Summary

Our results differ from Canada to the United States. We find that in Canada, promotion of one type of syrup will increase sales of that type of syrup (i.e. own-merchandising elasticities are positive and significant), but this does not hold true for syrup promotion efforts in the U.S. With respect to cross-merchandising, however, promotion in the form of feature or display in the U.S. seems to be effective in increasing sales of pure maple syrup. This is not the case for nonpure maple syrup in the U.S. or for either type of syrup in Canada. These findings are consistent with the results that pure and nonpure maple syrup are perceived as substitutes in the U.S., but not in Canada.

In conclusion, maple syrup consumers are price sensitive and appear to base purchase decisions on price rather than on feature/display promotion in the U.S. In Canada, however, promotional efforts in the form of feature/display seem to be effective in increasing demand. Results suggest that focusing promotional efforts on price reductions and looking closely at Canadian promotional efforts may be a step towards increasing demand. Consumers may also respond more strongly to other types of promotional activities. Given the finding that pure maple syrup is not perceived as a substitute for imitation maple syrup in both Canada and the U.S., pure maple promotions may be most effective if they focus on differentiating pure maple from its imitation counterpart.

## Limitations

Several limitations should be noted. Although a substantial portion of maple syrup purchases are made at supermarkets/grocery stores, there are several other important

marketing outlets, particularly in the Northeast. Purchases at farmstands, specialty product outlets, or at the site of production are not uncommon. It would be interesting to compare merchandising elasticities for the various marketing outlets. This research is currently in progress.

Another concern is the fact that our data assumes a constant quality within the pure maple syrup category. While we can differentiate quality *across* categories of syrup (pure versus imitation) we have not accounted for quality differences among the top five brands of *within* each category. This is not as large a problem for pure maple syrup, which is almost always available in the supermarket as Grade A medium or dark amber, as it is for imitation maple syrup, for which *Consumer Reports* (1991) found a wide variation in quality across brands.

Finally, there is room for improvement with respect to our measure of promotional efforts. Though our promotion variable includes retailers' use of features and displays, it does not make a distinction between these two types of promotion, nor does it take into account the form or content of the feature or display used. Use of more appropriate measures of promotional efforts may improve results. Additonally, estimating brand-level merchandising elasticities could also provide some useful insights.

## ENDNOTES

[1]Note that the number of brands will vary by city in Canada.

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*Table 1. Descriptive Statistics – Pure Maple Syrup – United States*

| VARIABLE NAME | LABEL | SMSA A | SMSA B | SMSA C | SMSA D | 4 SMSA AVERAGE |
|---|---|---|---|---|---|---|
| QUANTM | oz of pure maple syrup[a] | 347.59 | 1715.36 | 774.4 | 473.4 | 827.70 |
| QBRAND1M | oz of pure maple syrup | 167.55 | 723.94 | 226.65 | 219.85 | 334.50 |
| QBRAND2M | oz of pure maple syrup | 88.00 | 609.04 | 220.35 | 112.39 | 257.45 |
| QBRAND3M | oz of pure maple syrup | 52.08 | 244.74 | 193.18 | 61.62 | 137.92 |
| QBRAND4M | oz of pure maple syrup | 21.56 | 115.72 | 115.52 | 59.0 | 77.95 |
| QBRAND5M | oz of pure maple syrup | 18.40 | 21.92 | 18.70 | 20.52 | 19.89 |
| PRICEM | Price per oz. pure maple syrup | .27 | .25 | .28 | .27 | .27 |
| PRICEM1 | Price per oz. Brand 1 | .28 | .26 | .28 | .26 | .27 |
| PRICEM2 | Price per oz. Brand 2 | .29 | .28 | .31 | .26 | .29 |
| PRICEM3 | Price per oz. Brand 3 | .30 | .25 | .27 | .30 | .28 |
| PRICEM4 | Price per oz. Brand 4 | .24 | .25 | .28 | .26 | .26 |
| PRICEM5 | Price per oz. Brand 5 | .25 | .23 | .25 | .28 | .25 |
| MERCHM | % Stores Merchandising Pure Maple Syrup | 12.5 | 9.2 | 9.8 | 13.8 | 11.34 |
| MERCHB1 | % Stores Merchandising Brand 1 | 23.5 | 19.42 | 14.8 | 25.7 | 20.86 |
| MERCHB2 | % Stores Merchandising Brand 2 | 18.62 | 13.09 | 6.54 | 12.86 | 12.78 |
| MERCHB3 | % Stores Merchandising Brand 3 | 10.89 | 11.55 | 14.64 | 5.77 | 10.71 |
| MERCHB4 | % Stores Merchandising Brand 4 | 7.57 | 1.72 | 11.25 | 14.31 | 8.71 |
| MERCHB5 | % Stores Merchandising Brand 5 | 2.09 | 0.40 | 1.89 | 10.51 | 3.72 |
| PRICENMSUB | Average Price of Imitation Syrup | .08 | .07 | .08 | .08 | .08 |
| INCOME | Per Capita Income | 16,236 | 16,776 | 18,944 | 12,686 | 16,161 |

N = 260
[a] in thousands

*Table 2. Descriptive Statistics – Imitation Maple Syrup – United States*

| VARIABLE NAME | LABEL | SMSA A | SMSA B | SMSA C | SMSA D | 4 SMSA AVERAGE |
|---|---|---|---|---|---|---|
| QUANTNM | oz of imitation syrup[a] | 4508.50 | 23,809.99 | 14,933.25 | 3521.34 | 11,693.75 |
| QBRAND1NM | oz of imitation syrup | 1813.29 | 9227.64 | 4937.42 | 1630.83 | 4402.30 |
| QBRAND2NM | oz of imitation syrup | 783.94 | 7298.43 | 3339.24 | 613.36 | 3008.74 |
| QBRAND3NM | oz of imitation syrup | 736.93 | 2824.00 | 3027.65 | 581.99 | 1792.64 |
| QBRAND4NM | oz of imitation syrup | 633.47 | 2407.30 | 1830.28 | 363.93 | 1308.75 |
| QBRAND5NM | oz of imitation syrup | 540.87 | 2052.62 | 1798.66 | 331.23 | 1180.85 |
| PRICENM | Price per oz. imitation syrup | .08 | .07 | .08 | .08 | .08 |
| PRICENM1 | Price per oz. Brand 1 | .05 | .05 | .05 | .05 | .05 |
| PRICENM2 | Price per oz. Brand 2 | .09 | .08 | .09 | .08 | .085 |
| PRICENM3 | Price per oz. Brand 3 | .09 | .08 | .08 | .08 | .083 |
| PRICENM4 | Price per oz. Brand 4 | .09 | .08 | .08 | .08 | .083 |
| PRICENM5 | Price per oz. Brand 5 | .10 | .08 | .09 | .09 | .09 |
| MERCHNM | % of Stores Merchandising Imitation Syrup | 37.99 | 33.05 | 32.15 | 28.04 | 32.81 |
| MERCHNMB1 | % of stores merchandising Brand 1 | 47.93 | 37.90 | 29.76 | 38.39 | 38.50 |
| MERCHNMB2 | % of stores merchandising Brand 2 | 41.39 | 40.69 | 48.30 | 32.44 | 40.71 |
| MERCHNMB3 | % of stores merchandising Brand 3 | 44.49 | 36.33 | 33.40 | 30.84 | 36.27 |
| MERCHNMB4 | % of stores merchandising Brand 4 | 22.85 | 23.18 | 29.00 | 27.68 | 25.68 |
| MERCHNMB5 | % of stores merchandising Brand 5 | 33.31 | 27.15 | 20.31 | 10.84 | 22.90 |
| PRICEMSUB | Ave. Price Pure Syrup | .27 | .25 | .27 | .27 | .27 |
| INCOME | Per Capita Income | 16,236 | 16,776 | 18,944 | 12,686 | 16,161 |

N=260
[a] in thousands

*Table 3. Descriptive Statistics – Imitation Maple Syrup – United States*

| VARIABLE NAME | LABEL | PROVINCE E | PROVINCE F | 2 PROVINCE AVERAGE |
|---|---|---|---|---|
| QUANTM | oz. of pure maple syrup[a] | 284.09 | 123.7 | 217.42 |
| QBRAND1M | oz of pure maple syrup | 75.61 | 35.96 | 55.79 |
| QBRAND2M | oz of pure maple syrup | 94.74 | 46.98 | 70.86 |
| QBRAND3M | oz of pure maple syrup | 113.74 | 13.72 | 63.73 |
| QBRAND4M | oz of pure maple syrup | - | 27.04 | 27.04 |
| PRICEM | Price per oz. pure maple syrup | .22 | .31 | .27 |
| PRICEM1 | Price per oz. Brand 1 | .25 | .27 | .26 |
| PRICEM2 | Price per oz. Brand 2 | .22 | .33 | .28 |
| PRICEM3 | Price per oz. Brand 3 | .19 | .36 | .28 |
| PRICEM4 | Price per oz. Brand4 | – | .27 | .27 |
| MERCH | %Stores Merchandising pure Maple Syrup | 9.3 | 11.5 | 9.4 |
| MERCHB1 | % Stores Merchandising Brand 1 | 12.9 | 5.6 | 9.3 |
| MERCHB2 | % Stores Merchandising Brand 2 | 9.1 | 14.4 | 11.8 |
| MERCHB3 | % Stores Merchandising Brand 3 | 5.8 | 24.8 | 15.3 |
| MERCHB4 | % Stores Merchandising Brand 4 | – | 1.26 | 1.3 |
| PRICENMSUB | Average Price of Imitation Syrup | .07 | .09 | .08 |
| INCOME | Per Capita Income | 15,788 | 17,570 | 16,679 |

N = 99,132
[a] in thousands

*Table 4. Descriptive Statistics – Imitation Maple Syrup – Canada*

| VARIABLE NAME | LABEL | PROVINCE E | PROVINCE F | 2 PROVINCE AVERAGE |
|---|---|---|---|---|
| QUANTM | oz. of imitation maple syrup | 885.4 | 1778.25 | 1444.6 |
| QBRAND1NM | oz of imitation maple syrup | 220.5 | 557.5 | 389.0 |
| QBRAND2NM | oz of imitation maple syrup | 175.8 | 639.15 | 407.5 |
| QBRAND3NM | oz of imitation maple syrup | 263.6 | 581.6 | 422.6 |
| QBRAND4NM | oz of imitation maple syrup | 114.8 | – | 114.8 |
| QBRAND5NM | oz of imitation maple syrup | 110.7 | – | 110.7 |
| PRICEM | Price per oz. imitation maple syrup | .07 | .09 | .08 |
| PRICEM1 | Price per oz. Brand 1 | .08 | .08 | .08 |
| PRICEM2 | Price per oz. Brand 2 | .08 | .09 | .09 |
| PRICEM3 | Price per oz. Brand 3 | .07 | .09 | .08 |
| PRICEM4 | Price per oz. Brand 4 | .06 | | .06 |
| MERCH | %Stores Merchandising Imitation Maple Syrup | 18.2 | 27.6 | 21.23 |
| MERCHB1 | % Stores Merchandising Brand 1 | 8.1 | 33.0 | 20.6 |
| MERCHB2 | % Stores Merchandising Brand 2 | 17.8 | 25.1 | 21.5 |
| MERCHB3 | % Stores Merchandising Brand 3 | 33.0 | 24.8 | 28.9 |
| MERCHB4 | % Stores Merchandising Brand 4 | 13.9 | – | 13.9 |
| PRICEMSUB | Average Price of Pure Maple Syrup | .22 | .31 | .27 |
| INCOME | Per Capita Income | 15,788 | 17,570 | 16,679 |

N = 99,132
[a] in thousands

*Table 5. Parameter Estimates: Pure Maple Syrup in Four SMSAs - United States*

| VARIABLE NAME | LABEL | SMSA A | SMSA B | SMSA C | SMSA D |
|---|---|---|---|---|---|
| INTERCEPT | | .30 | -.83*** | -.34** | .04 |
| | | (1.35)a | (-2.82) | (-1.85) | (.18) |
| TIME | Time period (1-52) | .04 | .67*** | -.05 | -.24** |
| | | (.15) | (3.10) | (-.56) | (-2.18) |
| PRICEM | Price of 16oz Equivalent, maple | -.66*** | -.04*** | -2.21*** | -1.82*** |
| | | (-2.75) | (-2.44) | (-5.18) | (-4.33) |
| PB1M | Price* Brand 1 Dummy | .45 | -2.37*** | -1.02*** | -.52*** |
| | | (.286) | (-9.41) | (-4.72) | (-10.77) |
| PB2M | Price* Brand 2 Dummy | -.79*** | -2.14*** | -1.20*** | -.62*** |
| | | (-2.83) | (-9.65) | (-8.63) | (-5.88) |
| PB3M | Price* Brand 3 Dummy | -.02 | -1.52*** | -.65*** | -.38*** |
| | | (-.08) | (-7.64) | (-6.06) | (-3.47) |
| PB4M | Price* Brand 4 Dummy | .11 | -1.267*** | -.57*** | -.10 |
| | | (.41) | (-6.522) | (-5.35) | (-.98) |
| PRICENM | Price of imitation substitute | -.30 | .26 | 1.44*** | 1.12*** |
| | | (-.85) | (1.49) | (5.18) | (4.28) |
| MERCHM | % of stores merchandising maple | .0003 | .006 | .01 | .004 |
| | | (.01) | (.46) | (.98) | (.23) |
| MERCHNM | Ave. % of stores merchandising imitation maple | .08*** | .06*** | .06*** | .004 |
| | | (3.27) | (2.38) | (4.57) | (1.38) |
| INC | Annual Per Capita Income | .15* | .54*** | .6*** | .43*** |
| | | (1.80) | (7.45) | (16.93) | (10.03) |
| UNEMP | | | | | |
| System Weighted $R^2$ = .83 | N = | 260 | 260 | 260 | 260 |
| | Durbin Watson | 1.60 | 1.50 | 1.99 | 1.84 |

* Significant at <.10 level
** Significant at <.05 level
*** Significant at <.01 level
[a]T-statistics in parentheses

*Table 6. Parameter Estimates: Imitation Maple Syrup in Four SMSAs - United States*

| VARIABLE NAME | LABEL | SMSA A | SMSA B | SMSA C | SMSA D |
|---|---|---|---|---|---|
| INTERCEPT | | .004 | -.23* | -.20 | -.224 |
| | | (.04)a | (-1.69) | (-1.53) | (-1.22) |
| TIME | Time period (1-52) | .08*** | .16*** | .03 | .10*** |
| | | (2.22) | (4.46) | (-.99) | (2.83) |
| PRICENM | Price of 16oz Equivalent, imitation maple | -2.04*** | -2.18*** | -.31*** | .03 |
| | | (-8.40) | (-9.35) | (-2.55) | (.19) |
| PB1NM | Price* Brand 1 Dummy | .17 | -.05 | -.94*** | .17*** |
| | | (1.47) | (-.93) | (-9.85) | (6.25) |
| PB2NM | Price* Brand 2 Dummy | -.07*** | -.41*** | -.23*** | -.25*** |
| | | (-2.45) | (-12.44) | (-9.25) | (-8.18) |
| PB3NM | Price* Brand 3 Dummy | -.02 | -.10*** | -.18*** | -.23*** |
| | | (-.76) | (-3.10) | (-6.99) | (-7.73) |
| PB4NM | Price* Brand 4 Dummy | .02 | -.10*** | -.002 | .05* |
| | | (.91) | (-3.29) | (-.09) | (1.83) |
| PRICEM | Price of Pure maple substitute | -.03 | .16 | .06 | .07 |
| | | (-1.00) | (1.07) | (.38) | (.32) |
| MERCHNM | % of stores merchandising imitation maple | .001 | .02* | .06* | .01* |
| | | (.148) | (1.74) | (1.63) | (1.67) |
| MERCHM | Ave. % of stores merchandising pure maple | .007 | .008 | -.003 | .003 |
| | | (0.53) | (1.03) | (-.28) | (.32) |
| INC | Annual Per Capita Income | .16*** | .24*** | .71*** | .63*** |
| | | (2.23) | (3.57) | (21.39) | (23.31) |
| System Weighted $R^2$ = .83 | N = | 260 | 260 | 260 | 260 |
| | Durbin Watson | 1.65 | 1.85 | 1.89 | 1.81 |

* Significant at <.10 level
** Significant at <.05 level
*** Significant at <.01 level
[a]T-statistics in parentheses

*Table 7. Parameter Estimates: Pure Maple Syrup in Two Provinces - Canada*

| VARIABLE NAME | LABEL | PROVINCE E | PROVINCE F |
|---|---|---|---|
| INTERCEPT | | -.13<br>(-.70)[a] | -.51*<br>(-1.62) |
| TIME | Time period (1-33) | -.003<br>(-.045) | -.05<br>(-.47) |
| PRICEM | Price of 16oz Equivalent, pure maple | -2.89***<br>(-72.91) | -2.83***<br>(-24.91) |
| PB1M | Price* Brand 1 Dummy | -.19***<br>(-3.9) | -.003<br>(-.025) |
| PB2M | Price* Brand 2 Dummy | -.13***<br>(-2.85) | -.10<br>(-.84) |
| PB3M | Price* Brand 3 Dummy | – | – |
| PRICENM | Price of imitation substitute | .77<br>(1.48) | -.03<br>(-.30) |
| MERCHM | % of stores merchandising maple | .11***<br>(3.63) | .12***<br>(2.38) |
| MERCHNM | Ave. % of stores merchandising imitation maple | -.01<br>(-.37) | .01<br>(.10) |
| INC | Annual Per Capita Income | .51*<br>(1.82) | .25*<br>(1.70) |
| System Weighted $R^2$ = .89 | N= | 99 | 99. |
| | Durbin Watson | 1.82 | 1.87 |

* Significant at <.10 level
** Significant at <.05 level
*** Significant at <.01 level
[a]T-statistics in parentheses

*Table 8. Parameter Estimates: Non maple Syrup in Two Provinces - Canada*

| VARIABLE NAME | LABEL | PROVINCE E | PROVINCE F |
|---|---|---|---|
| INTERCEPT | | -.12<br>(-1.24)* | -.02<br>(-.17) |
| TIME | Time period (1-33) | -.04<br>(-.91) | .08***<br>(-3.96) |
| PRICENM | Price of 16oz Equivalent, imitation maple | -1.36***<br>(-5.0) | -2.89***<br>(-24.12) |
| PB1NM | Price* Brand 1 Dummy | -.10***<br>(-2.55) | -.08***<br>(-8.24) |
| PB2NM | Price* Brand 2 Dummy | -.03<br>(-.77) | .008<br>(.74) |
| PB3NM | Price* Brand 3 Dummy | -.008**<br>(-2.36) | – |
| PRICEM | Price of pure substitute | .07<br>(1.40) | -.001<br>(-.11) |
| MERCHM | % of stores merchandising maple | -.008<br>(-.35) | .02<br>(1.33) |
| MERCHNM | Ave. % if stores merchandising imitation maple | .10***<br>(5.84) | .08***<br>(4.58) |
| INC | Annual Per Capita Income | .74***<br>(4.49) | .02*<br>(1.85) |
| System Weighted $R^2$ = .89 | N= | 132 | 99 |
| | Durbin Watson | 1.87 | 1.83 |

* Significant at <.10 level
** Significant at <.05 level
*** Significant at <.01 level
*T-statistics in parentheses

*Table 9. Pure and Imitation Maple Syrup Price Elasticities: United States.*

| | SMSA A | | SMSA B | | SMSA C | | SMSA D | |
|---|---|---|---|---|---|---|---|---|
| | Imitation | Pure | Imitation | Pure | Imitation | Pure | Imitation | Pure |
| BRAND1 | -2.04 | -1.45 | -2.18 | -2.41 | -1.25 | -3.23 | -.17 | -2.34 |
| BRAND2 | - 2.11 | -1.45 | -2.59 | -2.18 | -.54 | -3.41 | -.25 | -2.44 |
| BRAND3 | -2.04 | -.66 | -2.28 | -1.56 | -.49 | -2.86 | -.23 | -2.20 |
| BRAND4 | - 2.04 | -.66 | -2.28 | -1.31 | -.31 | -2.78 | -.05 | -1.82 |
| BRAND5 | - 2.04 | -.66 | -2.18 | -.04 | -.31 | -2.21 | .00 | -1.82 |

*Table 10. Pure and Imitation Maple Syrup Price Elasticities: Canada*

| | PROVINCE E | | PROVINCE F | |
|---|---|---|---|---|
| | Imitation | Pure | Imitation | Pure |
| BRAND1 | -1.46 | -3.08 | -2.81 | -2.83 |
| BRAND2 | - 1.36 | -3.02 | -2.89 | -2.83 |
| BRAND3 | -1.37 | -2.89 | -2.89 | -2.83 |
| BRAND4 | - 1.36 | -2.89 | | |