

The Impact of Generic Advertising on Orange Juice Demand

The purpose of this study is to estimate the economic impact of generic advertising on the demand for orange juice. The model used is specified as follows:

$$(1) \quad \log(Q_{ojt}) = \alpha + \beta_1 \log(p_{ojt}) + \beta_2 \log(p_{gjt}) + \beta_3 \log(p_{ajt}) + \beta_4 \log(p_{gjt}) - \beta_5 \log(p_{jkt}) + \beta_6 \log(\text{Time}) \\ + \beta_7 \log(\text{Income}_t) + \beta_8 (\text{Adv. Exp.}_t) + \beta_9 \text{A/B Ads}_t + \beta_{10} \text{Disp Ads}_t + \beta_{11} \text{Season} + e_t$$

where

Q_{ojt} = the per capita demand for orange juice in retail outlets doing \$4 million or greater annual business during period t ;

p_{ojt} = the retail price of orange juice during period t ;

p_{gjt} = the retail price of grapefruit juice during period t ;

p_{gjt} = the retail price of grape juice during period t ;

p_{ajt} = the retail price of apple juice during period t ;

p_{jkt} = the retail price of juice drinks during period t ;

Time = a time trend variable;

Income_t = real per capita income during period t ;

Adv. Exp._t = FDOC advertising expenditure during period t ;

A/B Ads_t = the percentage of grocery store business with A/B ads during period t ;

Disp Ads_t = the percentage of store business with displays accompanied with ads during period t ;

Season = a variable for seasonality;

e_t = disturbance term for period t ;

and α and β_s are parameters to be estimated.

Juice sales data used in this study were provided by A. C. Nielsen Company and FDOC advertising expenditure data were obtained from Saatchi & Saatchi *Network Stewardship Reports* for the study period on a weekly basis. The data covered the period from July 1992 through July 1994. Ordinary least squares method was used to estimate the demand parameters and results are presented in Table 1. The result shows that the demand for orange juice is inversely related to its own-price and positively related to the prices of apple juice and juice drinks. The result presented in Table 1 also show that there is a seasonal pattern in the demand for orange juice and that A/B ads and FDOC generic advertising had positive impacts on the demand for orange juice. The own-price and generic advertising elasticity estimates are -0.53 and 0.005, respectively.

Estimated Impact of Generic Advertising on Orange Juice Demand

In order to estimate the impact of generic advertising on orange juice demand the following assumptions were made

1. Since the Nielsen market only covers about half the total US market, we assumed the non-Nielsen part of the US market responds to the price of OJ and FDOC advertising on OJ in

the same way as in that part of the market covered by the Nielsen data.

2. Further, Florida OJ only accounts for part of the US OJ market with imports accounting for the remainder, and some Florida OJ is exported. We assumed that the Nielsen estimates, which are based on the aggregate Florida and foreign OJ in the retail market, are applicable to Florida OJ, both that going to the domestic market (most is sold here) and that exported (a relatively small amount).

3. We also assumed that price changes at the retail level will be fully passed down to the grower level.

4. The level of Florida OJ production was assumed to be fixed in 1993-94 and not a function of the 1993-94 price. We also assumed that the amount of Florida OJ produced in 1993-94 was the amount consumed in this season. There may be reallocation of OJ consumption between seasons as the price of OJ varies but it was not assumed to be a large amount in this analysis.

5. The Nielsen data analyzed covered three years, and only the immediate advertising impact, as opposed to lag impacts, were estimated. Lag impacts have probably been important for creating the consumer base for OJ. If FDOC OJ advertising were eliminated, there may be an erosion of this consumer base over a period of time. Our estimates do not capture this possibility and, hence, our estimates may under state the actual long-run impact.

6. FDOC TV OJ advertising expenditures per week, provided by Saatchi and Saatchi, were matched with Nielsen sales to estimate the advertising impact. We were not able to obtain reliable estimates for other FDOC OJ advertising impacts or for brand advertising impacts.

The impact of FDOC OJ advertising on Florida citrus grower revenue was estimated using the estimates of equation (1) which are shown in Table 1. Recall that equation (1) relates Nielsen OJ gallon sales per week in \$4 million plus stores to a number of variables including the price of OJ, the prices of substitute juice products, consumer income, seasonality, retail promotional variables and the amount of FDOC expenditures on OJ advertising. For the present analysis, we focus on two particular demand estimates: 1) the price elasticity of demand for OJ which was estimated at $-.53$ (a 1% change in the OJ price results in a .53% change in OJ gallon sales in the opposite direction), and 2) the FDOC OJ advertising expenditure elasticity which was estimated at $.005$ (a 1% change in FDOC OJ advertising expenditure results in a .005% change in OJ gallon sales). These two demand estimates were used to obtain an estimate of the value of the FDOC OJ advertising to Florida growers in 1993-94. The estimate of value for the FDOC OJ program was found by estimating how much the price of OJ would decrease when the FDOC advertising level were set to zero (eliminated), assuming a fixed amount of Florida OJ pound solids (PS) produced for the season.

In 1993-94, an estimated 1,049 million PS of OJ were produced in Florida. The 1993-94 retail price was \$3.38 per single strength equivalent(SSE) gallon or \$3.285 per PS. The

\$3.285/PS price is what occurred with FDOC OJ consumer advertising expenditure of about \$18.7 million in 1993-94. If the FDOC OJ advertising expenditure had been set to zero in 1993-94, the price of OJ would have been \$3.255/PS, based on the above OJ demand estimates, or the value of the FDOC OJ advertising was \$.03/PS. Applying this value to the 1,049 PS produced by Florida citrus growers yields an estimated \$31.5 million value to the growers (as previously stated, we assume that a given OJ price change at the retail level will be passed down to the grower level eventually). Hence, for the \$18.7 million in advertising spent by growers, \$31.5 million were received in return in the form of a higher OJ price, or the estimated return per dollar spent on advertising was \$1.68 ($\$31.5/\18.7).

Table 1. Orange juice demand parameter estimates

Variable	Parameter Estimate	Standard Error	t-Ratio	Prob > t
Intercept	1.8521	2.0047	0.9240	0.3571
$\log(p_{oj})$	-0.5329	0.0948	-5.6180	0.0001
$\log(p_{gi})$	-0.3563	0.1643	-2.1690	0.0317
$\log(p_{ai})$	0.3802	0.1301	2.9220	0.0040
$\log(p_{gij})$	-0.1849	0.2106	-0.8780	0.3815
$\log(p_{jk})$	0.7338	0.0945	7.7640	0.0001
$\log(\text{Time})$	0.1563	0.0607	2.5750	0.0110
$\log(\text{Income})$	-1.0355	0.4086	-2.5340	0.0123
A/B Ads	0.0018	0.0009	2.0480	0.0424
DispAds	0.0019	0.0020	0.9290	0.3543
Adv.Exp.	1.59890e-05	9.62000e-06	1.6620	0.0988
Season	5.86880e-05	2.05000e-05	2.8630	0.0048
R-square	0.7168			
Adj R-sq	0.6953			

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