Journal of Agricultural and Resource Economics 21(2):199–209

Generic Advertising Wearout: The Case of the New York City Fluid Milk Campaign

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This article examines two major generic fluid milk advertising campaigns in New York City during the 1986–92 period. Estimates from a time-varying parameter model show that the evolution of the impact of generic advertising on fluid milk sales over each campaign followed a bell-shaped pattern. Results also show that the first campaign was effective for twice as long as the second campaign and that it had a higher peak and higher average advertising elasticity. These findings may reflect long-term generic milk advertising wearout in the New York City market.

Key words: advertising wearout, generic advertising, milk, time-varying parameters

Introduction

There has been considerable research on the economic impact of generic advertising over the past two decades (see Forker and Ward and the annotated bibliography by Hurst and Forker). With few exceptions, previous studies have assumed that advertising elasticities are constant over time. This assumption runs counter to the advertising wearout hypothesis, which states that the effectiveness of an advertising campaign will eventually decay. Dynamic advertising elasticities have important implications for both commodity promotion research and allocation of advertising expenditures. Econometric models that allow for time-varying market responses to generic promotion more accurately represent the sales/advertising relation (Kinnucan and Venkateswaran).

Despite its relevance for promotion program evaluation and resource allocation, only two studies have explored the question of generic advertising wearout. Kinnucan, Chang, and Venkateswaran (KCV, hereafter) studied the New York City (NYC) fluid milk campaign during 1971–84. Although they did find evidence of campaign wearout, they also discovered that successive campaigns displayed increasing effectiveness. Kinnucan and Venkateswaran examined the Ontario fluid milk campaign and found that advertising elasticities declined over 1973–87.

The commercials employed in generic fluid milk advertising in the NYC market over 1986–92 can be partitioned into two major campaigns.[1] The first campaign focused on milk's nutritional benefits, while the second was aimed at increasing fluid milk consumption by adults. The present study estimates the rate of change of advertising elasticities over time and examines if these campaigns exhibited advertising wearout. Differences in effectiveness of the two campaigns are also examined.

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[1] For this study, the NYC market includes northern New Jersey and several counties surrounding New York City.

Following KCV, a time-varying parameter model is used to model advertising wearout. However, the approach used here to model and estimate the time-varying advertising coefficients improves on KCV's approach in three major ways. First, the advertising goodwill variable is specified to more appropriately account for the periods during which campaign effects overlap.[2] Given carryover effects of advertising, at the start of a new campaign there is a period during which goodwill depends on both the new and old campaigns. KCV treated the contribution of the old campaign to the goodwill measure as if the new campaign had generated it. In this article, the contribution of each campaign during the transition periods is properly identified. Second, the empirical model is estimated through nonlinear least squares and thus avoids the two-step linear estimation procedure used in KCV. Third, time-varying advertising goodwill coefficients are modeled using a flexible specification and a statistical test is applied to determine if these coefficients are random.

The Conceptual Framework

Advertising wearout theory suggests that a particular campaign's effect on sales varies over time—at first increasing and then decreasing. A time-varying parameter model is used to test this hypothesis. Specifically, consider the following demand equation for fluid milk:

$$(1) \qquad Y_t = \alpha + \sum_{k=1}^{K} \beta_k X_{tk} + \sum_{i=1}^{I} \gamma_{ti} G_{ti} + \mu_t \qquad t = 1, \ldots, N,$$

where Y_t denotes the quantity sold at period t ($t=1, \ldots, N$), X_{tk} represents the tth observation on the kth ($k=1, \ldots, K$) explanatory variable, G_{ti} is the stock of advertising goodwill (Nerlove and Waugh; Kinnucan and Forker; KCV) at period t generated by the ith ($i=1, \ldots, I$) campaign, α, β_k, and γ_{ti} are unknown parameters, and μ_t is a random error term with mean zero and variance σ^2_μ.[3]

The parameter on G_{ti}, γ_{ti}, is subscripted by t to indicate that it can change over the sample observations. A difficulty with this model is that there are at least $1+K+N$ coefficients to be estimated with only N observations.[4] Thus, it is necessary to impose some structure on how γ_{ti} may vary over time. The goodwill parameter is specified as a function of calendar time and a random disturbance term (Singh et al.) :

$$(2) \qquad \gamma_{ti} = \exp(\Psi_{0i} + \Psi_{1i} T_{ti} + \Psi_{2i} T_{ti}^2) + \epsilon_{ti},$$

where $\exp(\cdot)$ represents the exponential function; T_{ti} is a linear time trend; and Ψ_{0i}, Ψ_{1i}, and Ψ_{2i} are parameters common to all the observations corresponding to the ith campaign. The time-trend variable, T_{ti}, measures the duration of the ith campaign from its inception until period t. This variable is assumed to capture time-related factors that have systematic effects on γ_{ti} and for which there are no observations available. The second-order

[2] KCV treated the carryover effects of advertising on fluid milk demand as a stock (versus flow) concept and defined advertising goodwill as "an intangible demand-generating asset" (p. 405). This convention is adopted in the present study and the terms "goodwill," "advertising goodwill," and "stock of goodwill advertising" are used interchangeably.

[3] Note that the specification of the demand equation in (1) assumes that advertising is only a demand shifter, i.e., advertising expenditures do not affect income or price elasticities.

[4] There are at least N goodwill coefficients, one for each time period. If two or more campaigns overlap there will be more than N goodwill coefficients.

(quadratic) exponential function used to model the trajectory of γ_{ti} over time is quite flexible, allowing for a large family of unimodal response curves. Random factors affecting the goodwill parameter may include, for example, transitory changes in consumers' attitudes toward fluid milk caused by negative or positive health-related publicity. The following assumptions are made about the distribution of ϵ_{ti}:[5]

$$\epsilon_{ti} \sim (0,\sigma^2_{\epsilon i}); \quad E(\epsilon_{ti},\mu_t) = 0 \quad \forall t,i; \quad E(\epsilon_{ti},\epsilon_{\tau i}) = E(\epsilon_{ti},\epsilon_{th}) = 0 \quad t\neq\tau, \quad i\neq h.$$

The goodwill stock generated by the ith campaign at period t is expressed as:

(3) $$G_{ti} = \sum_{j=0}^{J} \omega_{ji} A_{t-j} TH_{ji} \qquad i = 1, \ldots, I.$$

The ω_{ji} are lag weights, A_{t-j} is per capita advertising expenditure in period $t-j$, J is the length of the weighting period, and TH_{ji} is a binary variable equal to one if A_{t-j} corresponds to the ith campaign theme and zero otherwise. Lagged advertising expenditures are included in the construction of G_{ti} to account for delays in the sales response to advertising (see Forker and Ward, p.169). Thus, the impact of a given campaign may extend beyond the end of the campaign and the stock of advertising goodwill at period t may consist of the sum of the goodwill stocks generated by the current and past campaigns. For this reason, $TH_{ji}=1$ for all periods t such that $t\in[\Upsilon_i,\bar{\Upsilon}_{i+j}]$ where Υ_i and $\bar{\Upsilon}_i$ are the beginning and ending period, respectively, of the ith campaign. Also, the range of T_{ti} in (2) is $[1, \bar{\Upsilon}_i-\Upsilon_i+1+J]$, where $\bar{\Upsilon}_i-\Upsilon_i+1$ is the length in months of the campaign.[6] That is, because of the lagged response of sales to advertising, the range of T_{ti} should not be truncated at the last period consumers were exposed to the campaign. The last two points were overlooked in KCV. Despite assuming a six-month advertising carryover period, KCV modeled the impact of each campaign as lasting only from the first to the last period of the campaign. Moreover, for the overlapping period between two campaigns, they treated lagged advertising expenditures corresponding to the old campaign as pertaining to the new campaign.

The Empirical Model

Following Cox, a quadratic exponential function is used to model the lag weights:

(4) $$\omega_{ji} = \exp(\phi_{0i} + \phi_{1i}j + \phi_{2i}j^2).$$

Previous studies (Thompson, Eiler, and Forker; Kinnucan; Kinnucan and Forker; KCV) have found that a lag length of six months is appropriate to model the carryover effect of generic milk advertising in the NYC market. A lag length of six is also consistent with Clarke's observation that "90 percent of the cumulative effect of advertising on sales of mature, frequently purchased, low-priced products occurs within 3 to 9 months of the advertisement" (p. 355). Based on the above considerations, the value of J in (3) is set to six. To obtain a parsimonious lag structure, the weight on the sixth lag is restricted to be approximately equal to zero and the weight on the current period adver-

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[5] For simplicity, it is assumed that each campaign starts after the end of the previous campaign, i.e., there is no overlap of campaigns at period t.

[6] The first value of T_{t1} will not be one if the first campaign started before the sample period. Likewise, the sample may not include the last period of the last campaign.

tising expenditures is restricted to one.[7] The latter restriction [i.e., $\omega_{0i}=\exp(\phi_{0i})=1$] requires $\phi_{0i}=0$, and the sixth lag weight [i.e., $\omega_{6i}=\exp(\phi_{0i}+\phi_{1i}6+\phi_{2i}36)$] is restricted to equal $\exp(-30)$. Using the above restrictions (i.e., $\phi_{0i}=0$ and $\phi_{0i}+\phi_{1i}6+\phi_{2i}36=-30$),

$$\phi_{1i}6+\phi_{2i}36=-30. \tag{5a}$$

Solving this expression for ϕ_{1i} yields

$$\phi_{1i}=-5-\phi_{2i}6. \tag{5b}$$

After substituting ϕ_{1i} into (4) and collecting the terms involving ϕ_{2i}, the lag weights have the following form:

$$\omega_{ji}=\exp[-5j+\phi_{2i}(j^2-6j)], \qquad j=0, \ldots, 5. \tag{5c}$$

As Cox points out, this specification can represent either geometric decay or a lagged peak of the lag coefficients, depending on the sign of ϕ_{2i}.

The empirical counterpart of the demand equation in (1) is specified as:

$$\ln Q_t = \alpha + \beta_1 \ln PM_t + \beta_2 \ln INC_t + \sum_{d=1}^{6} S_d + \sum_{i=1}^{I} \gamma_{ti} G_{ti} + \mu_t, \tag{6}$$

where ln denotes natural logarithm, Q_t is monthly per capita consumption of fluid milk in gallons, PM_t is the retail price of milk deflated by a nonalcoholic beverages price index, and INC_t is monthly real per capita income. The S_ds are harmonic terms included to model the seasonal pattern of milk consumption in NYC (Liu and Forker; Liu, Conrad, and Forker). The harmonic terms have the following form (Doran and Quilkey):

$$S_d=\delta_d COS_d+\varphi_d SIN_d \qquad d=1, \ldots, 5, \tag{7a}$$

and

$$S_6=\delta_6 COS_6, \tag{7b}$$

where $COS_d=\cos(\pi td/6)$ and $SIN_d=\sin(\pi td/6)$, $\cos(\cdot)$ and $\sin(\cdot)$ represent the cosine and sine functions, and δ_d and φ_d are unknown parameters. At most 11 harmonic coefficients can be estimated because $\sin(\pi td/6)$ is always zero when d equals 6.

Substituting (2) and (3) into (6) yields

$$\begin{aligned} \ln Q_t = {} & \alpha + \beta_1 \ln PM_t + \beta_2 \ln INC_t + \sum_{d=1}^{6} S_d \\ & + \sum_{i=1}^{I} \left[\exp(\Psi_{0i} + \Psi_{1i} T_{ti} + \Psi_{2i} T_{ti}^2) \sum_{j=0}^{5} \omega_{ji} A_{t-j} TH_{ji} \right] + \nu_t, \end{aligned} \tag{8}$$

where

$$\nu_t = \mu_t + \sum_{i=1}^{I} \sum_{j=0}^{5} \epsilon_{ti} \omega_{ji} A_{t-j} TH_{ji} \tag{9}$$

is a heteroskedastic error term with variance

[7] Note that the restriction $\omega_{0i}=1$ is merely a normalization with no effect on the advertising elasticities.

$$\sigma^2_{v_t} = \sigma^2_{\mu} + \sum_{i=1}^{I}\sum_{j=0}^{5} \sigma^2_{ei}(\omega_{ji}A_{t-j}TH_{ji})^2. \tag{10}$$

The heteroskedasticity of v_t is due to the presence of the stochastic term in (2). Testing for heteroskedasticity of the form represented by (10) is equivalent to testing for the adequacy of including an additive disturbance term in (2).

Note that although the logarithmic transformation is applied to milk sales, price, and income, the goodwill variable is not transformed because G_{ti} is zero when all the campaign indicator variables (e.g., the TH_{ji}s) are zero.

Data Issues and Estimation Procedures

Equation (8) was estimated using monthly data from January 1986 through December 1992. The variable PM_t is the average price of a gallon of fluid milk for NYC deflated by a nonalcoholic beverages price index for the Northeast. Per capita income was deflated by the CPI for all items for NYC.[8] The advertising expenditure data were deflated by a media cost index specific to the NYC coverage area.[9]

The values of the T_{ti} and TH_{ji} variables are defined based on the primary message of each campaign. Following this criterion, it is possible to identify two major campaigns for the sampling period. The first campaign covered the period January 1986 to February 1989 and emphasized the benefits of milk's nutrients. The second campaign ran from March 1989 to December 1992 and its major theme was that adults should drink more milk.[10] Based on this, the values of the trend and campaign indicator variables are given by:

$$T_{t1} = \begin{cases} 5, \ldots, 47 & \text{for } t = 1, \ldots, 43; \\ 0 & \text{otherwise,} \end{cases}$$

$$T_{t2} = \begin{cases} 1, \ldots, 46 & \text{for } t = 39, \ldots, 84; \\ 0 & \text{otherwise,} \end{cases}$$

$$TH_{j1} = \begin{cases} 1 & \text{for } t = 6, \ldots, 38 + j, \quad j = 0, \ldots, 5; \\ 0 & \text{otherwise,} \end{cases}$$

$$TH_{j2} = \begin{cases} 1 & \text{for } t = 39, \ldots, 84, \quad j = 0, \ldots, 5; \\ 0 & \text{otherwise.} \end{cases}$$

The model was estimated by nonlinear least squares (NLS) using the Davidson-Fletcher-Powell algorithm in Shazam version 7.0 with a convergence criterion of 0.000001.

[8] Note that the expression in (8) is a Hicksian demand function obtained by substituting the Slutsky equation into a Marshallian demand function and using the CPI to approximate Stone's price index (e.g., Deaton and Muellbauer, p. 62). Moreover, given the assumption that nonalcoholic beverages are the only substitutes for fluid milk, homogeneity was imposed by deflating the price of milk by the nonalcoholic beverages price index. The latter does not include the price of milk. Milk price is a component of the dairy products index.

[9] Data for fluid milk sales and price were obtained from the New York State Department of Agriculture and Markets and the New York–New Jersey Federal Marketing Order. Income and population data were collected from various issues of the New York State Statistical Yearbook. The advertising data were obtained from the advertising agency D'Arcy, Masius, Benton, and Bowles. The nonalcoholic beverages price index and the CPI were obtained from the CPI Detailed Report.

[10] The beginning period of the first campaign is September 1985 and the second campaign actually ended in February 1993. The procedure followed to record advertising expenditures was changed in January 1986. To avoid data inconsistencies, the present study covers only the 1986–92 period. Data on advertising expenditures are not available beyond December 1992.

Results and Testing Procedures

Following the suggestion of Bera and Jarque, the null hypotheses that the disturbances υ_t in (8) are homoskedastic and serially independent are tested simultaneously. Tests designed for diagnosing one misspecification at a time (one-directional tests) are not, in general, robust in the presence of other misspecifications. In particular, it is virtually impossible to determine the power and significance level of most one-directional tests in such cases. The test procedure proposed by Bera and Jarque, which is capable of testing a number of specifications simultaneously, is particularly appropriate for the current model since υ_t could potentially exhibit both heteroskedasticity and serial correlation.

The joint test is based on the Lagrange multiplier (LM) principle and the test statistic is

$$\Lambda = \lambda_H + \lambda_A, \tag{11}$$

where λ_H is the Breusch-Pagan test statistic for heteroskedasticity (Godfrey, p.128) and λ_A is the LM-based test statistic for first-order autocorrelation (Godfrey, p.117). For the model in (8)–(10), λ_H is one-half the explained sum of squares from the following regression:

$$\frac{\hat{\upsilon}_t^2}{\hat{\sigma}_\upsilon^2} - 1 = \sigma_\mu^2 + \sum_{i=1}^{2}\sum_{j=0}^{5} b_{ji}(A_{t-j}TH_{t-ji})^2 + r_{tH}, \tag{12}$$

where $\hat{\upsilon}_t$ is the tth NLS residual from estimation of (8),

$$\hat{\sigma}_\upsilon^2 = (N-5)^{-1}\sum_{t=6}^{N}\hat{\upsilon}_t^2, \qquad b_{ji} = \sigma_{\epsilon i}^2\omega_{ji}^2,$$

and r_{tH} is an error term.[11] The test statistic λ_A is $N-5$ times the uncentered R^2 for the regression

$$\hat{\upsilon}_t = c\hat{\nabla}'_t + \rho\hat{\upsilon}_{t-1} + r_{tA}, \tag{13}$$

where $\hat{\nabla}_t$ denotes the tth row of the matrix of derivatives of the regression equation in (8) evaluated at the least squares estimates, (c,ρ) is a vector of coefficients, and r_{tA} is an error term. The joint test statistic Λ has an asymptotic χ^2 distribution with degrees of freedom equal to the sum of the degrees of freedom of the two one-directional tests, $(2\times(5+1))+1=13$ in this case. The calculated value of Λ is 9.33852, with a p-value of 0.747. This result provides evidence that random elements do not impact the level of the goodwill parameter, γ_{ti} [i.e., it is not necessary to add a random term ϵ_{ti} to the exponential quadratic function in (2)], and that υ_t does not exhibit first-order autocorrelation.

The estimation results are reported in table 1. The R^2 values indicate that the estimated model has good explanatory power. The signs of the estimated coefficients are consistent with prior expectations based on economic theory and the wearout hypothesis. Consistent with prior studies (Kinnucan; Kinnucan and Forker; Liu and Forker; KCV), the demand for milk in NYC is found to be price and income inelastic. Following the procedure

[11] Note that the effective number of observations used to estimate (8) is $N-5$ because the goodwill variable includes lagged values of advertising expenditures.

Table 1. Nonlinear Least Squares Parameter Estimates for Fluid Milk Demand

Parameter	Variable	Estimated Value	t-Value
α	Intercept	0.4450	0.7421
β_1	Price of milk	−0.1240	−2.1134
β_2	Income	0.5302	0.6400
δ_1	COS_1	0.0140	4.5515
δ_4	COS_4	−0.0226	−9.0704
δ_5	COS_5	0.0103	4.1286
δ_6	COS_6	0.0128	4.7207
φ_1	SIN_1	0.0248	7.7912
φ_2	SIN_2	0.0267	9.4239
φ_3	SIN_3	0.0105	4.3663
φ_4	SIN_4	0.0061	2.3424
φ_5	SIN_5	−0.0072	−3.9170
Ψ_{01}	G_{t1} (first campaign)	−27.6150	−3.5361
Ψ_{11}	$T_1 \times G_{t1}$ (first campaign)	0.1949	1.8711
Ψ_{21}	$T_1^2 \times G_{t1}$ (first campaign)	−0.0050	−2.0960
ϕ_{21}	Lag weights (first campaign)	−4.5434	−4.9121
Ψ_{02}	G_{t2} (second campaign)	−3.5032	−2.5200
Ψ_{12}	$T_2 \times G_{t2}$ (second campaign)	0.5930	2.3731
Ψ_{22}	$T_2^2 \times G_{t2}$ (second campaign)	−0.0291	−2.5702
ϕ_{22}	Lag weights (second campaign)	−1.2244	−8.3794

Note: The sum of squared residuals was 0.0172, the R^2 was 0.8824, and the adjusted R^2 was 0.8418.

suggested by Doran and Quilkey, only the harmonic variables with significant coefficients at the 5% level were retained in the final model specification.

The signs and magnitudes of the estimated coefficients associated with the linear and quadratic time trends ($\Psi_{\ell i}$, for ℓ, i =1,2) imply that the advertising goodwill parameters, γ_{t1} and γ_{t2}, follow a bell-shaped pattern. For the demand equation in (8) the advertising goodwill elasticities are given by

$$(14) \qquad \zeta_{ti} = \frac{\partial Q_t}{\partial G_{ti}} \frac{G_{ti}}{Q_t} = \gamma_{ti} G_{ti} = \exp(\Psi_{0i} + \Psi_{1i} T_i + \Psi_{2i} T_i^2) \sum_{j=0}^{5} \omega_{ji} A_{t-j} TH_{ji}.$$

The value of ζ_{ti} depends not only on γ_{ti} but on the level of the goodwill variable as well, which in turn depends on current and past advertising expenditures. Therefore, the evolution of ζ_{ti} over time will not correspond exactly to that of γ_{ti}.

For each campaign, the P-test (Davidson and MacKinnon, pp.382–86) was used to test the model specification in (8) versus a nonnested model with no advertising goodwill term.[12] The null hypothesis that the model in (8) generated the data could not be rejected

[12] That is, each alternative model was obtained by dropping $\gamma_{t1}G_{t1}$ or $\gamma_{t2}G_{t2}$ from the demand equation in (8). Note that a nonnested hypothesis testing procedure is appropriate in this case because the alternative models cannot be obtained by imposing restrictions on the parameters of (8). Specifically, the advertising goodwill elasticities are always positive regardless of the values of $\Psi_{\ell i}$ and ϕ_{2i} (ℓ=0,1,2; i=1,2) because the goodwill coefficient in (2) is modeled using an exponential function. An alternative specification of the goodwill coefficient that does not restrict its sign is the quadratic function used in KCV [as opposed to the exponential quadratic function in (2)]. A P_A-test was used to test this specification versus the specification adopted in this study. The test did not reject the null model estimated here at the 5% significance level while it did reject the alternative specification when the hypotheses were reversed.

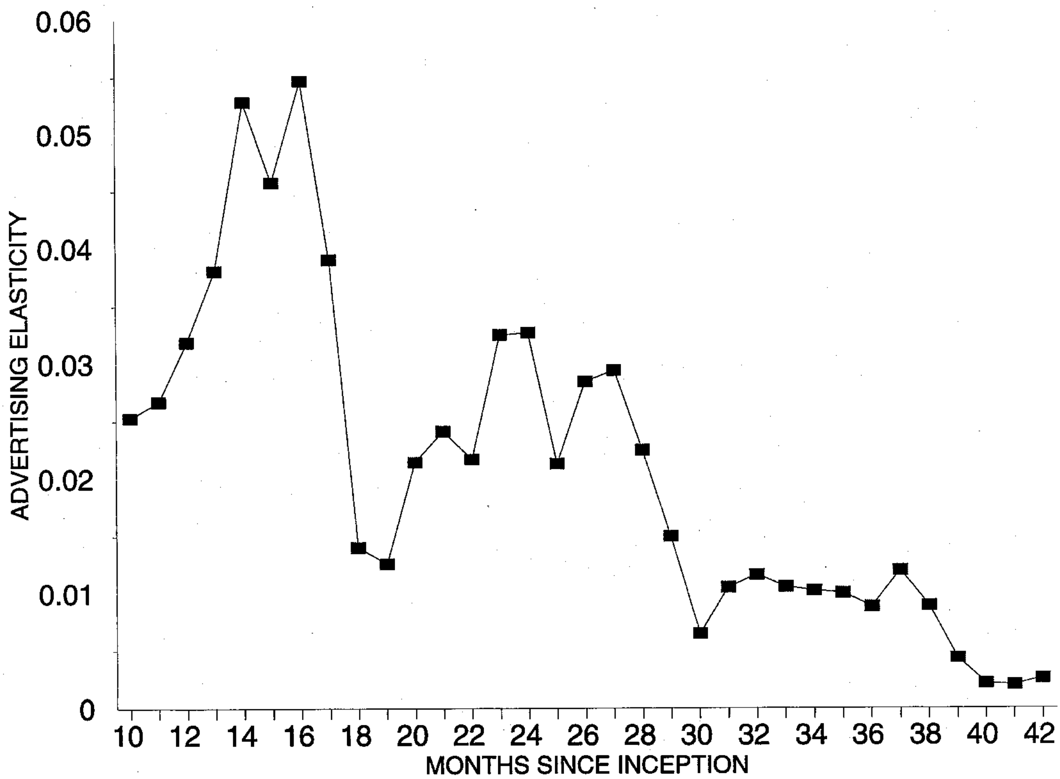

Figure 1. Advertising elasticity for the first campaign

at the 5% significance level. Conversely, when the null and alternative hypotheses were reversed, the model with no advertising goodwill term was rejected in each instance. These results imply that the estimated model is superior to a model that does not account for the impact of generic advertising on fluid milk demand. A Wald test of the joint null hypothesis that the goodwill coefficients are time-invariant and that the lag weights coefficient is the same for both campaigns (i.e., $\Psi_{01} = \Psi_{02}$, $\Psi_{\ell i} = 0$ for $\ell, i = 1{,}2$ and $\phi_{21} = \phi_{22}$) resulted in a test statistic of 38.384 with a p-value of 0. This result indicates that the goodwill coefficients vary over time and that the advertising elasticities differ between the two campaigns. Moreover, the latter cannot be attributed only to differences in the levels of advertising expenditures.

The values of the goodwill elasticities for the first campaign are plotted in figure 1 for $T_{t1} = 10, \ldots, 42$ (i.e., for the period June 1986–February 1989).[13] The elasticities for the second campaign for $T_{t2} = 6, \ldots, 46$ (i.e., for the period August 1989–December 1992) are plotted in figure 2. The highest values for ζ_{t1} and ζ_{t2} are 0.05466 and 0.0477. The lowest values for the first campaign is 0.002, while for the second campaign is close to zero. By way of comparison, KCV's elasticity estimates range from 0.0003 to 0.0720. Other fluid milk advertising elasticity values for the NYC market reported in the literature range from 0.00172 (Liu and Forker) to 0.054 (Kinnucan).

For the first campaign, the positive impact of advertising lasted until the end of the

[13] Recall that the first sample period corresponds to the fifth period of the first campaign. Also, the elasticities for the first five sample periods cannot be computed due to the lag structure imposed on the goodwill variable.

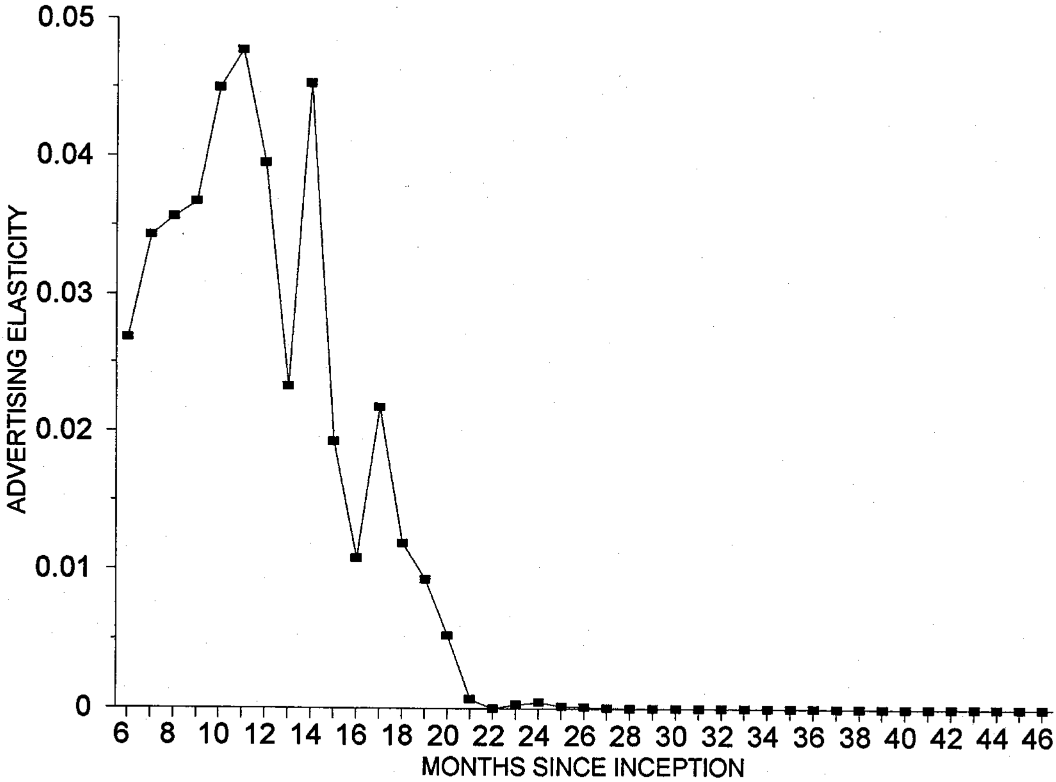

Figure 2. Advertising elasticity for the second campaign

campaign or around 42 months from its inception. The second campaign lasted half as long before becoming ineffective. In addition, the average advertising elasticity for the second campaign is 0.0099, which is about 50% lower than that for the first campaign. The first campaign clearly had a longer "shelf life" than the second campaign. The reason for this phenomenon, however, is uncertain. It is worth noting that the level of advertising expenditures was quite volatile for the last two-thirds of the second campaign (see fig. 3). Whether this was a factor affecting the performance of the second campaign remains to be explored.

The lower peak and average responses and the rapid decline of the advertising elasticities associated with the second campaign indicate a decreasing effectiveness of generic milk advertising in NYC over the 1986–92 period. In an earlier study of the NYC market (1971–84), KCV found the effectiveness of generic fluid milk advertising to consistently increase over time and attributed this pattern to the dairy farm board and advertising agency becoming more adept as they gained experience in advertising milk. The opposite finding of this study may reflect a short-run deviation from KCV's pattern simply due to an ineffective second campaign. Alternatively, the decline in effectiveness over the 1986–92 period may reflect longer-term generic milk advertising wearout in the NYC market. If the NYC market is indeed becoming less responsive to generic milk advertising, then advertising expenditures should be diverted to other markets in New York State with higher sales responsiveness. In any event, additional research on why the second campaign performed poorly relative to the first campaign is warranted.

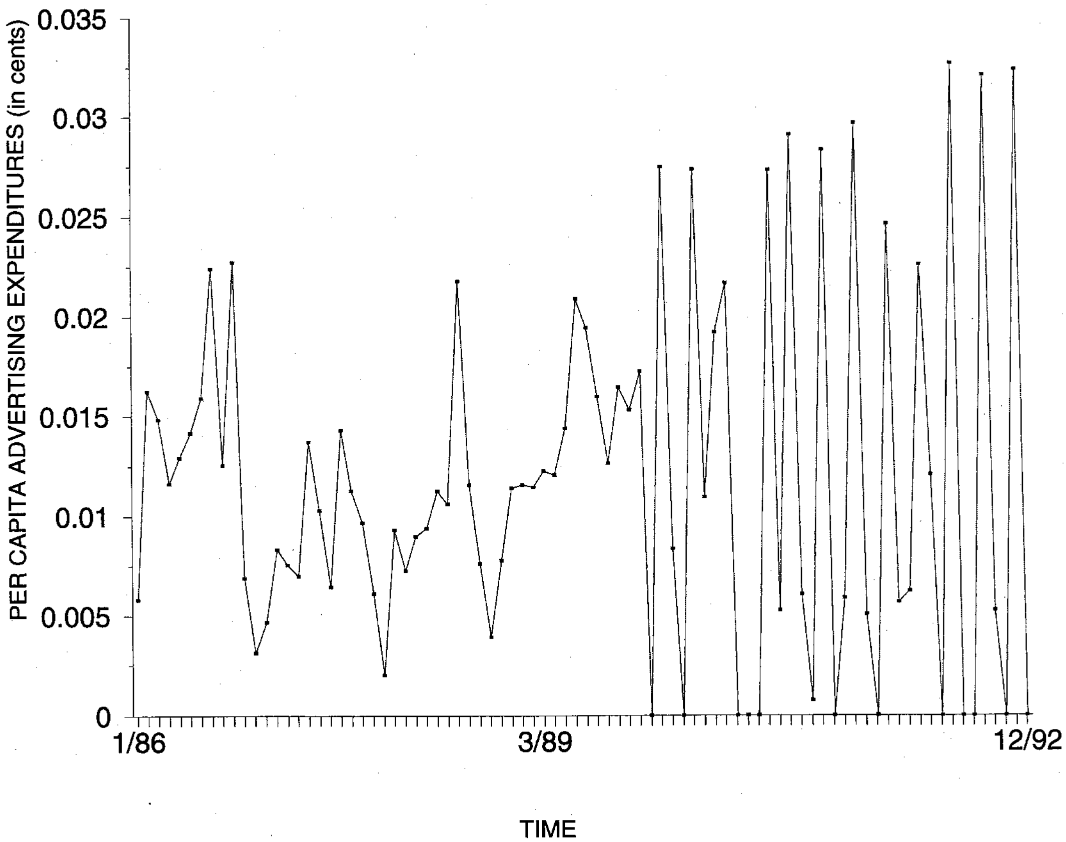

Figure 3. Real per capita advertising expenditures January 1986–December 1992 (in cents)

Concluding Comments

The empirical results of this study show that the two major generic fluid milk advertising campaigns in NYC during the 1986–92 period exhibited wearout. These results provide further evidence of the dynamic behavior of sales responses to generic advertising (Ward and Myers; Kinnucan and Forker; KCV; Kinnucan and Venkateswaran). Policy recommendations based on econometric models that allow for time-varying advertising coefficients are likely to be more useful for promotion program managers. Taking into account the dynamic nature of advertising responses should improve strategic decisions regarding campaign duration, copy replacement, and allocation of expenditures over time.

Another important finding of this study is that the two campaigns differed considerably in effectiveness. The peak and average advertising elasticities of the first campaign (January 1986 through February 1989) were higher and its impact on sales lasted twice as long compared with the second campaign (March 1989 through December 1992). Program managers should carefully examine the message and spending strategies of each campaign to try to determine why the first campaign was so much more successful than the second campaign. In addition, long-term generic fluid milk advertising wearout in the NYC market should receive particular attention as a plausible cause for the overall decline in sales responsiveness over the 1986–92 period.

[*Received July 1995; final version received June 1996.*]

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