Title: Effect of Generic Promotion of Flowers on the Use of Retail Flower Outlets.

Authors: Arbindra Rimal and Ronald W. Ward

Affiliation: University of Florida

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Arbindra Rimal and Ronald W. Ward[1]

A generic promotion program for fresh-cut flowers and greens known as PromoFlor was implemented in late 1993 with advertising programs starting in 1996. In June 1997 the program was terminated through a scheduled voter referendum among those flower handlers subject to the checkoff assessment. An economic evaluation of the PromoFlor (Ward, 1997) showed that the program was successful in expanding total expenditures on fresh cut flowers. While many issues can be cited that potentially contributed to the negative vote, issues centering around equity are of particular interest. Discussion about the assessment exemption level was an issue where firms with less than $750,000 in sales were exempted. Another equity issue focuses on the distribution of benefits within the fresh cut flower distribution system. While the assessments were at the handler level, there were clear benefits closer to the retail level. Did the generic promotions through PromoFlor generate sales gains equitably among the major retail outlets? That is, were the generic efforts "outlet neutral?"

To address the outlet issue, data on household purchases of fresh-cut flowers through all types of outlets were used. Commercial data from NPD Group included information on several thousand households reporting details on both the quantity and expenditures on flower purchases, outlet selection, flower type, along with a wide range of information on household profiles. Using these data, the market share for each retail

[1]Arbindra Rimal is a Ph.D. candidate and Ronald W. Ward is a Professor in the Food and Resource Economics Department, University of Florida.

outlet can be calculated and then used to determine if there is any relationship between the outlet shares and PromoFlor's activities.

The role of Advertising

In order to deal with the role of PromoFlor's impact on outlet shares, one must first have a theoretical framework for introducing advertising into the demand/market share structure. Each consumer has a most preferred bundle of attributes and will make purchases consistent with that preferred bundle. Both generic and brand promotions may influence the mix of the preferred bundle as well as change some of the perceived attributes, in both situations impacting the demand for the advertised commodity. Furthermore, the same promotions may or may not change the market shares among those selling the good (e.g., retail outlets for fresh-cut flowers.)

Let $D=D(p,a,y)$ be the demand for a commodity, $S=S(w)$ is the short-run supply, and $S=S(p,w)$ is the supply for a longer period. Also, define p to represent price, a the advertising expenditures, y is consumer income, and w represents the unit cost. For a given set of market conditions and no advertising as illustrated with Figure 1, one would expect the demand for the product to be $D_{1.}$ Now let advertising increase in equal increments as suggested with the left axis in this figure. A promotion increase from a_1 to a_5 produces an upward demand shift to D_5. With supply curve S(w), price increases from p_0 to $p_{1.}$ With supply curve S(p,w) this increase is to p_2. At the pre-advertising level, industry revenues stood at p_0 Q_1 while with the fixed supply revenues increased to p_1 Q_1 or a gross gain of $(p_1-p_0)Q_1$.

While aggregate demand may shift upward as illustrate, of equal importance is how the gains are distributed among those generating the revenues. In Figure 1 these distributions of revenues are reflected through changes in the market shares among the different outlets for fresh-cut flowers and specifically the shares among florists, supermarkets, and other retail outlets. With a fixed level of brand advertising, florists share of the retail sales is MS_0. If generic promotion of flowers is *outlet neutral,* then the market share for florists remains fixed as indicated with the horizontal line (MS_0).

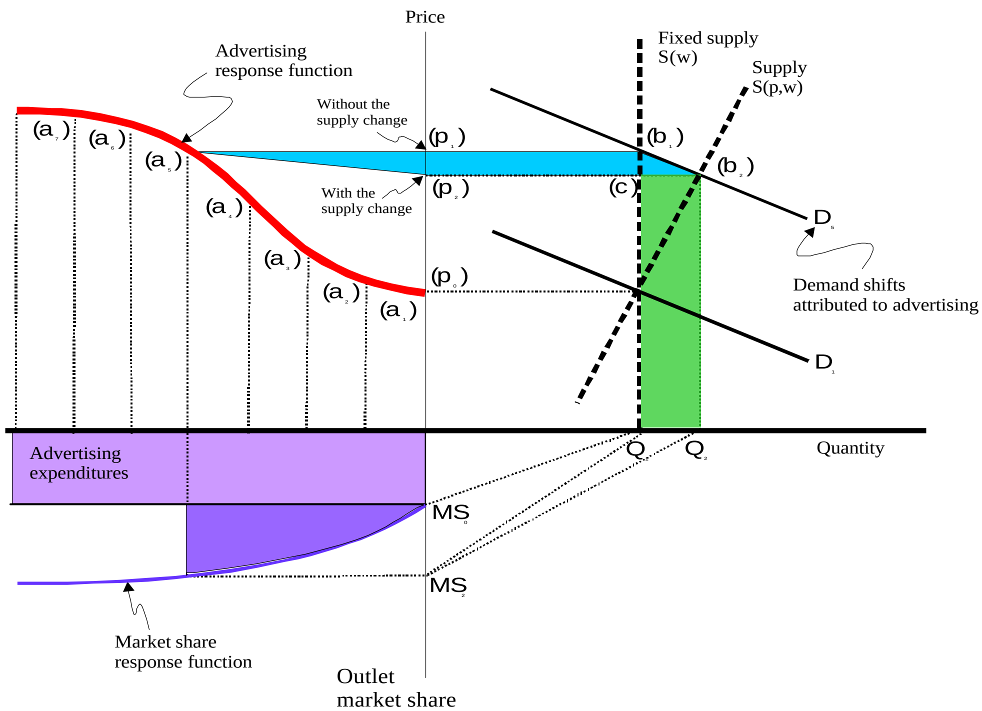

Figure 1: Market share changes and the advertising response curve (Ward, 1997).

Now suppose that the generic advertising for cut flowers is not outlet neutral. Then generic advertising may reinforce some of the differentiating attributes of the products sold through different outlets. In this scenario, generic advertising has expanded total demand but also increased the market share from MS_0 to MS_2. Another alternative is that generic promotions emphasize the common attributes and thus reduce any differentiation among brands or outlets. In this case, the market share response would shift toward the horizontal promotion axis.

Determining the brand (or outlet) neutrality of the generic efforts has a wide range of policy implications, particularly for program restructuring. If the situation as illustrated with a movement from MS_0 to MS_2 occurred, then there is an important equity issue relating to distribution of benefits at the retail level. The challenge is one of measuring expenditure allocation decisions among households buying fresh-cut flowers through different outlets. This immediately suggests using the range of demand systems models with the demand for products differing by outlet (e.g., fresh-cut flowers through a florist are different from the same flowers bought through a supermarket.)

Promotions and the Retail Cut Flower Industry

Fresh-cut flowers constitute about 52 percent of the flower retail sales with the rest being dried and artificial flowers (Ward, 1997). Flower sales vary across income groups where households with less than $25,000 annual income (Group 1)account for 22.7 percent of the total sales; those with income from $25000 to $49,000 (Group 2)account for 35.8 percent; those with incomes ranging from $50,000 to $74,999 (Group 3)account for 23.4 percent; and finally the highest income group (Group 4)accounts for the remaining 18.1 percent of dollar sales. In terms of retail outlets for these flowers, florists average approximately 68 percent of the total retail sales of cut flowers; supermarkets contribute 18 percent; and others account for the remaining 14 percent. Uses of these outlets differ across the four income groups.

The attribute bundle associated with the floral products of each type of retail outlet determines the degree of substitutability among the retail outlets. If the retail outlets are not perfect substitutes, then flower consumers' optimal allocation of their total flower expenditures among various retail outlets is determined by many other variables apart from prices. Hence, expenditure allocation decisions of consumers collectively determine the relative market share of the three types of retail outlets for flowers. Promotions may or may not play a role in the allocation decisions.

Theoretical Framework

Theoretically, consumer demand involves choosing a combination of goods and services that best satisfies his or her wants given the income level. In many advertising studies it is assumed that consumers' knowledge about the goods and services influences preferences. It is also assumed that advertising changes the stock of knowledge, and hence preferences (Lee et al, 1989). With these assumptions, a utility function for a consumer can be written:

$$u = u(q_1, q_2, \ldots\ldots, q_n, k) \tag{1}$$

where *k* is the stock of knowledge for the current period. Each consumer maximizes utility subject to the budget constraint expressed as: $\sum p_{iq_i} = m$. If we assume that the utility function (1) is separable and additive we can specify models that allow for optimizing at multiple stages. The assumption of separability allows bypassing each stage of optimization and concentrate strictly on the cut flowers sold through retail outlets.

There are various functional forms used in estimating demand models. Because of its theoretical consistency and flexibility, many studies on promotion and advertising using demand models employ the AIDS or linear-AIDS (Green, et al, 1992; Richard et al, 1997; Duffy, 1995, etc.). Drawing on the AIDS specification, the equation for the budget share of i^{th} good (outlet)is:

$$w_{it} = \alpha_i + \sum_{j=1}^{3} \Theta_{ijt} + \sum_{i=1}^{3} \gamma_{ij} \ln\ p_{it} + \beta_i (\ln\ \mu_t - \ln\ P_t), \quad \forall\ i,j = 1,2,3 \tag{2}$$

where 1=florists, 2=supermarkets, and 3=other outlets. Further, define:

$$\ln P_t = \sum_k (\alpha_k + \Theta_{kjt}) \ln p_{kt} + 1/2 \sum_k \sum_j \gamma_{kj} \ln p_{kt} \ln p_{jt} \tag{3}$$

and

$$\Theta_{i1t} = \lambda_{1i} PF_t + \lambda_{2i} OA_t \tag{4}$$

where PF=PromoFlor expenditures and OA=other advertising expenditures:

$$\Theta_{i2t} = \tau_{1i} SI_t \tag{5}$$

SI is a seasonal index:

$$\Theta_{i3t} = \varepsilon_{1i} SLF_{1t} + \varepsilon_{2i} SLF_{2t} + \varepsilon_{3i} GFT_{1t} + \varepsilon_{4i} GFT_{2t} \tag{6}$$

where SLF_1= principle component representing physical attributes as the reasons behind purchasing flowers for self, SLF_2=principle component representing perceived attributes as the reasons behind purchasing flowers for self, GFT_1= principle component representing physical attributes as the reasons behind purchasing flowers for giving gifts, GFT_2=principle component representing perceived attributes as the reasons behind purchasing flowers for giving gifts.

A system of demand equations for each type of fresh-cut flower products for four income groups is estimated independently with the assumptions that error terms among the equations are related within each income group. Models are estimated using maximum likelihood procedures for seemingly unrelated regressions (SUR) and the appropriate price, income elasticities, and market share elasticities are computed.

Empirical Results

The estimated parameters and p-values for the AIDS outlet share models across income groups are reported in Table 1 and the appropriate elasticities are included in Table 2. Parameters relating to price effects are statistically significant at the 5 percent level for all income groups except Group 3. Most demand elasticities were consistent with expectations and are plausible. The compensated own-price elasticities were all negative for all income groups. Cross price elasticities indicate that different outlets are substitutes. The expenditure elasticities show that, except for the lowest income group, increases in the expenditures on cut flowers will lead to increases in purchases through florists and decreases in purchases through supermarkets and other outlets.

In relation to promotion effects, the results were mixed. Effect of PromFlor was significant and positive on florists and marginally significant and negative on supermarkets for income Group 2. For the rest of the income groups the effect is statistically insignificant. The effects of other advertising were positive and significant on florists for income Groups 2 and 3 and negative and insignificant for supermarkets in Group 2.

Simulating Outlet Shares

Estimates from the AIDs model point to differences in the impact from PromoFlor (generic) and brand promotions on the use of outlets. Further, the results showed differences across the four income groups with both PromoFlor and brand advertising having significant impacts on the outlet shares. While the models were estimated across income groups, a major issue is the aggregate impact of these promotion activities on the market shares between florists, supermarkets, and all others. To show the aggregate impact, one can take the share models and simulate changes in either generic and /or brand promotions and then show the impact on each outlet share. That is, show the total share change aggregating over the four income groups. The results from this procedure are depicted in Figures 2a-2b. In each graph, the mean monthly promotion ($) level for 1996 is adjusted by expressing the promotions as an index of the mean level. For example, in each figure the bottom axis shows the promotions as a percent of the mean monthly promotion expenditures in 1996 with the value of 1.0 reflecting the indexed expenditures with no adjustments to the promotion levels. Each figure is expressed in terms of the indexed adjustment level on the bottom axis, while the outlet share is on the right vertical axis and the simulated household expenditures are on the left vertical axis. Aggregating over the income groups, Figures 2a and 2b show the impact from changing PromoFlor's generic promotions on the outlet shares for florists and supermarkets. Each solid line with the closed dots corresponds to the right axis or market shares while the open circle line is associated with the left axis or cut flower expenditures by outlet.

There are minimal share changes among florists, supermarket, and others when the generic promotions are ranged from 55 percent of the mean level to 150 percent of the mean. For both outlets the share response is flat, showing extremely small changes in household expenditures and the outlet shares of these expenditures. There is no evidence of any numerically important change in the shares and hence one would conclude that the generic promotions of fresh-cut flowers were not outlet bias. That is, in Figure 1 the market share curve remains flat over the range of simulated expenditures changes.

Brand advertising was expected to be outlet bias since most of the brand promotions are linked to florists and the services provided. FTD activities are a good case in point. Figures 2c and 2d provide the simulated share responses to changes in the level of brand promotion activities. In direct contrast to that shown for PromoFlor, florist share of the fresh-cut flower market directly increases with more brand promotion efforts. While the numbers are small in absolute terms, the florist share increases from around 66 percent to slightly more than 68 percent of the market as a direct result from increasing the brand promotions. Figure 2c shows a two percentage point spread in shares over the range of promotion expenditures. The results with Figure 2d indicate that most of the florist gain in shares from the brand promotion occur at a cost of declining supermarket shares, although not totally. Clearly, the combined results from these figures point to the outlet neutrality of the generic efforts in the aggregate and the expected shifts in market shares attributed to the brand promotions.

Conclusions

Generic promotions of fresh-cut flowers have been shown to be outlet neutral in terms of household selection of retail alternatives for buying flowers. Consistent when theoretical arguments, the brand advertising of flowers has contributed to a slight positive gain to the florists sector of the flower distribution system. These results follow from using an AIDs applied to four income groups. Only the promotional aspects of the share model have been detailed while recognizing the wide range of additional insights can be presented. Among these include the price effects on outlet selection and the projections of longer term outlet shares with growth (or declines) in the total expenditures on fresh cut flowers. Also, the regional differences in responses to the national generic programs has been considered but not presented in the current paper. This analysis is for a program that no longer exists. Yet, the insights gained from this type analysis have important contributions to future directions when dealing with new and/or restructure checkoff programs.

Table 1: Almost Ideal Demand System Results for Total Fresh Cut flowers

Parameters	Income Group 1 (Under $25,000)		Income Group 2 ($25,000-$49,999)		Income Group 3 ($50,000-$74,999)		Income Group 4 (Over $75,000)	
Price Effects	**Coeff.**	**P-Value**	**Coeff.**	**P-Value**	**Coeff.**	**P-Value**	**Coeff.**	**P-Value**
γ_{11}	0.06498	(.0071)	0.10226	(.0000)	0.01222	(.8139)	0.07805	(.0245)
$\gamma_{12}=\gamma_{21}$	-0.03192	(.0480)	-0.04195	(.0050)	-0.01005	(.7290)	-0.04037	(.0116)
$\gamma_{13}=-\gamma_{11}-\gamma_{12}=\gamma_{31}$	-0.03306	-	-0.06031	-	-0.00217	-	-0.03768	-
γ_{22}	0.07963	(.0000)	0.04603	(.0007)	0.03513	(.1168)	0.06669	(.0000)
$\gamma_{23}=-\gamma_{22}-\gamma_{21}=\gamma_{32}$	-0.04771	-	-0.00408	-	-0.02508	-	-0.02632	-
$\gamma_{33}=-\gamma_{31}-\gamma_{32}$	0.08078	-	0.06439	-	0.02725	-	0.06400	-
Expenditure Effects								
β_1	-0.00215	(.9639)	0.03851	(.1593)	0.08998	(.0018)	0.06369	(.0360)
β_2	0.00292	(.9082)	-0.02288	(.2575)	-0.05107	(.0083)	-0.02874	(.0550)
$\beta_3=-\beta_1-\beta_2$	-0.00077	-	-0.01563	-	-0.03891	-	-0.03496	-
Seasonality								
τ_1	0.03783	(.5692)	-0.01078	(.8041)	0.05202	(.2927)	0.02845	(.6612)
τ_2	-0.00560	(.8754)	-0.00757	(.8108)	-0.02991	(.3502)	0.00505	(.8720)
$\tau_3=-\tau_1-\tau_2$	-0.03223	-	0.01836	-	-0.02212	-	-0.03350	-
Advertising Effects: PromoFlor								
λ_{11}	-0.00022	(.7900)	0.00127	(.0150)	-0.00112	(.1626)	-0.00009	(.9324)
λ_{12}	0.00080	(.0697)	-0.00064	(.0926)	-0.00010	(.8514)	0.00050	(.3140)
$\lambda_{13}=-\lambda_{11}-\lambda_{12}$	-0.00058	-	-0.00063	-	0.00121	-	-0.00041	-
Advertising Effects: Other Advertising								
λ_{21}	0.00047	(.2697)	0.00070	(.0141)	0.00097	(.0052)	0.00061	(.2490)
λ_{22}	-0.00015	(.5182)	-0.00055	(.0085)	-0.00020	(.3671)	0.00026	(.2981)
$\lambda_{23}=-\lambda_{21}-\lambda_{22}$	-0.00032	-	-0.00015	-	-0.00077	-	-0.00087	-
Behavioral Effects								
ε_{11}	0.01686	(.1623)	-0.01418	(.0765)	-0.00259	(.7793)	-0.03897	(.0038)
ε_{12}	-0.01253	(.0554)	0.00912	(.1200)	0.01305	(.0276)	0.02286	(.0004)
$\varepsilon_{13}=-\varepsilon_{11}-\varepsilon_{12}$	-0.00433	-	0.00506	-	-0.01046	-	0.01610	-
ε_{21}	-0.00059	(.9552)	-0.00159	(.7974)	-0.00171	(.8462)	0.00218	(.8555)
ε_{22}	-0.00248	(.6627)	-0.00596	(.1861)	0.00135	(.8135)	-0.00629	(.2716)
$\varepsilon_{23}=-\varepsilon_{21}-\varepsilon_{22}$	0.00306	-	0.00755	-	0.00036	-	0.00411	-
ε_{31}	0.01391	(.2397)	-0.02435	(.0141)	0.01262	(.1879)	-0.02910	(.0317)
ε_{32}	-0.00281	(.6579)	0.01701	(.0187)	-0.01356	(.0293)	-0.00324	(.6135)
$\varepsilon_{33}=-\varepsilon_{31}-\varepsilon_{32}$	-0.01110	-	0.00734	-	0.00094	-	0.03234	-
ε_{41}	-0.01159	(.2683)	0.01029	(.0996)	0.01287	(.1325)	-0.00920	(.5017)
ε_{42}	0.00774	(.1637)	-0.00515	(.2549)	-0.00157	(.7756)	0.00614	(.3432)
$\varepsilon_{43}=-\varepsilon_{41}-\varepsilon_{42}$	0.00385	-	-0.00513	-	-0.01130	-	0.00306	-

Table 2: Estimated demand and Promotion elasticities using AIDS model for Fresh Cut flowers

	Income Group 1 (Under $25,000)	**Income Group 2 ($25,000-$49,999)**	**Income Group 3 ($50,000-$74,999)**	**Income Group 4 (Over $75,000)**
Compensated demand elasticities:				
ϵ^*_{11}	-0.24869	-0.15065	-0.16125	-0.19414
ϵ^*_{12}	0.48324	0.42098	0.38524	0.30855
ϵ^*_{13}	0.44311	0.16236	0.44400	0.33904
ϵ^*_{22}	-0.39034	-0.54440	-0.46643	-0.40646
ϵ^*_{23}	-0.11111	0.18699	0.10180	0.08595
ϵ^*_{33}	-0.33200	-0.34935	-0.54580	-0.42500
Income Elasticities:				
η_1	0.99669	1.05673	1.12525	1.10178
η_2	1.01538	0.88192	0.67405	0.83718
η_3	0.99517	0.87731	0.68860	0.82319
Promotion Elasticities				
ξ^p_1	-0.00216	0.01264	-0.01100	-0.00118
ξ^p_2	0.02692	-0.02251	-0.00131	0.01865
ξ^p_3	-0.02476	0.00988	0.01231	-0.01747
ξ^A_1	0.02119	0.03200	0.04427	0.03009
ξ^A_2	-0.02393	-0.07762	-0.01685	0.04884
ξ^A_3	0.00274	0.04562	-0.02742	-0.07893

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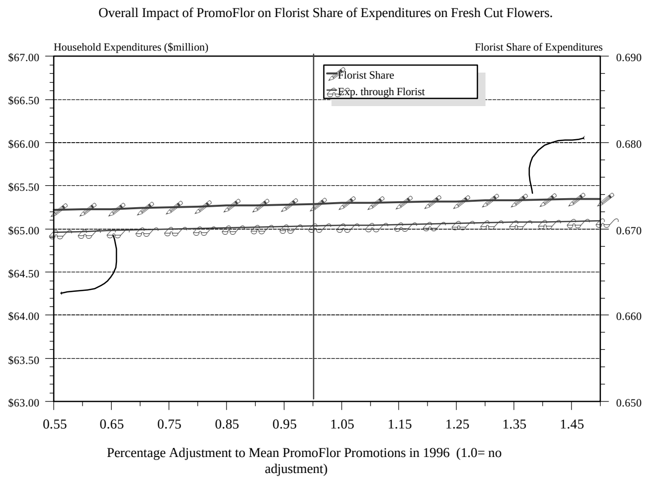

Figure 2a

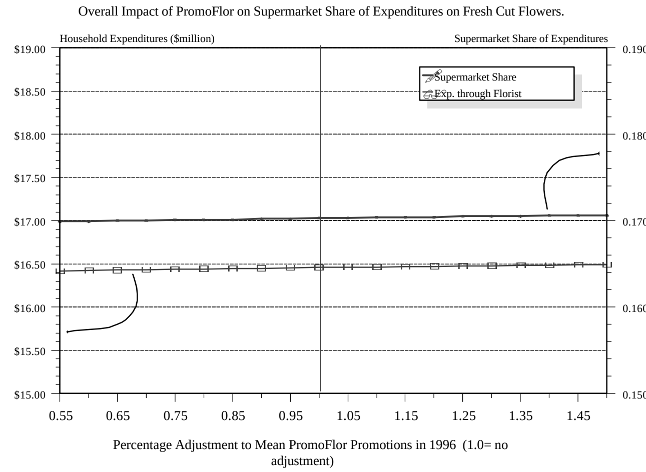

Figure 2b

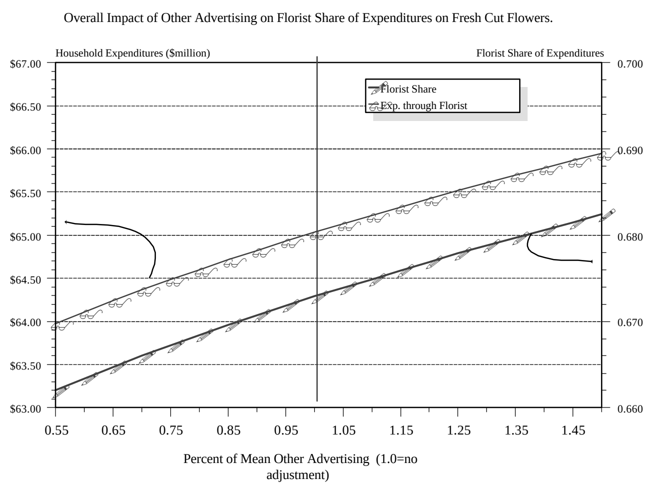

Figure 2c

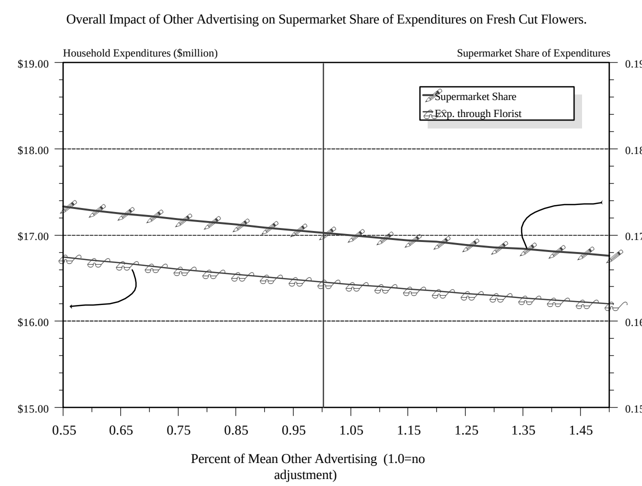

Figure 2d

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Abstract

AIDs demand models are used to test if the generic promotion of fresh-cut flowers influenced the market shares for florists, supermarkets, and other retail outlets. Were the generic efforts outlet neutral? Generic promotions of fresh-cut flowers is shown to be outlet neutral while the brand advertising increased florists' market share.

Keywords: Fresh-cut flowers, generic promotion, AIDs model