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Advertising and Promotion Investment: What Is the Right Level?

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**CORNELL
AGRICULTURAL ECONOMICS
STAFF PAPER**

**ADVERTISING AND
PROMOTION INVESTMENT:**

What is the right level?

by
Olan D. Forker

December 1990

No. 90-20

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ABSTRACT

Agricultural economists in both the United States and Canada have been trying to answer this complicated question for over 12 years. Although there is no simple answer, researchers generally agree that the "right level" of advertising investment is a function of the promotion program's objective. The actual level of advertising investment in 1987 totaled \$490 million in 22 dairy-producing countries. The United States, Canada, Australia, and the United Kingdom have similar levels of promotion investment per unit of milk production (\$0.12 to \$0.17 per hundredweight). A review of economic studies indicates commodity advertising investment in the U.S. is probably less than optimum at its current level of around \$145 million.

ADVERTISING AND PROMOTION INVESTMENT: WHAT IS THE RIGHT LEVEL?

by

Olan D. Forker¹

INTRODUCTION

"What is the 'right level' of investment for generic promotion?" Agricultural economists in both the United States and Canada have been trying to answer this complicated question for over 12 years. Although there is no simple answer, researchers generally agree that the "right level" of advertising investment is a function of the promotion program's objective. Several objectives are possible--to improve a commodity's image, increase sales, or maximize producer income, as examples--with the "right level" being different for each. Once the program objective is identified, it is then possible to determine the "right level" of investment with the right kind of economic analysis.

This presentation has three parts. First, information about the current level of assessment for generic dairy product advertising and promotion in the dairy industry worldwide will be provided. Second, the factors that must be considered in trying to answer this important question will be discussed. Third, research results and statements about whether the current levels of expenditure are anywhere near the right levels will be presented.

CURRENT LEVEL OF ASSESSMENT AROUND THE WORLD

The amount of generic and brand advertising investment for 22 countries is reported in the Bulletin of the International Dairy Federation, No. 237/1989. According to that report, these 22 countries invested \$490 million in generic promotion activities in 1987, an investment of \$.126 per hundredweight (cwt.) of milk produced. The biggest investment in terms of the production base was Iceland at \$0.63 per cwt. The smallest was Hungary at \$0.002 per cwt. The numbers for 8 of the countries are presented in Table 1. Of these 8 countries, Japan had the largest investment per unit of milk production; Sweden had the largest investment per consumer. The United States, Canada, Australia, and the United Kingdom had similar levels of investment per unit of production (\$0.12 to \$0.17 per cwt.) and per consumer (\$.079 to \$1.07). Are any of these levels of investment anywhere near the right levels?

Several factors must be considered. First, what is the program objective? Second, what are the relationships between advertising expenditures and producer returns. Third, how does one determine the "right level" to satisfy the stated objective?

¹ Olan D. Forker is Professor of Agricultural Economics, Cornell University. This paper was presented at the International Dairy Congress in Montreal, Canada, on October 10, 1990.

Table 1. Generic Milk Promotion Investments, Selected Countries, 1988, U.S. Dollars, Ranked by Per Capita Expenditures

Country	Generic expenditures			As a percent of all milk advertising
	Total (million)	Per capita	Per hundredweight	
Sweden	\$ 28.4	\$3.38	\$0.38	100 ¹
Canada	27.6	1.07	0.17	49
Australia	15.7	0.97	0.12	65
U.S.A.	200.0	0.82	0.14	38
Japan	96.9	0.79	0.61	100 ¹
U.K.	44.7	0.79	0.13	46
France	11.2	0.20	0.02	6
India	10.4	0.01	0.11	100 ¹

¹ No brand advertising reported for these countries.

Source: Calculated from information in the Bulletin of the International Dairy Federation, No. 237/1989 and No. 243/1989.

POSSIBLE OBJECTIVES

It should be obvious that the answer to the "right level" question depends on the objective. For clarity, let's discuss some possible objectives. What do the farmers, the farmer board of directors, the managers, or the legislators hope to accomplish?

Change Image

One possible objective is the improvement of the commodity's image. At least one example is in order. The California Raisin Advisory Board in the early 1980s set an objective of changing the consumer's image of raisins from negative to positive. Research indicated that consumers had positive beliefs about the nutritional value of raisins but had a negative attitude overall. That is, raisins were considered good for you, but were viewed as being ugly, wrinkled, dried up, and unexciting. The commercial, designed specifically to change raisins' image, is the now world-renowned California Raisin claymation commercial series. I am told that the tracking studies indicate that, in fact, consumers now view raisins in a positive light-- fun, exciting, tasty, and good for you. It was a modest objective with a modest budget of under \$10 million per year. And they achieved their objective. Did they know the money they had available was at the right level before they started the program? I doubt that they were able to calculate precisely the right amount, but they designed a program to fit their objective and budget. It is possible that they could have achieved the same objective with less money. Also, the results might have been quite different (better or worse) with different creative work and a different delivery.

It is hoped that the improved image will result in increased sales over the long run. But in the short run, increased sales was a secondary objective. In fact, during the first three years of the campaign, demand for raisins appeared to remain the same. Now that the image-change objective has been achieved, I understand that the strategy has shifted to a more hard-sell attempt to increase demand.

Increase Sales

An alternative objective might be to increase sales or per capita consumption to some prescribed level. If this is the objective, then to achieve the "right level" we need to know the relationship between advertising expenditure levels and sales, normally referred to as the advertising elasticity. I have collected advertising elasticities from several studies² (Table 2). For fluid milk, they range from a low of 0.004 from a recent study of the Ontario, Canada generic fluid milk advertising program to a high of 0.275 from a study 15 years ago of the California fluid milk advertising program. If the advertising elasticity is known and it is constant over the range of alternative investment levels, then it is possible to determine the percent increase in advertising investment needed to achieve a specified percent increase in sales. If this is known for all program activities, then one can determine the "right level" of investment per unit of milk produced or per consumer.

²These advertising elasticities vary because they represent measurements over different time periods, different markets, different media messages and mixes, and different analytical methods.

Table 2. Generic Advertising Elasticities, Selected Studies

Product/market	Elasticity	Source ¹
<u>Fluid milk</u>		
California	0.275	Thompson, <u>JNAEC</u> 1974
New York City	0.047	Thompson, AES 1978
New York City	0.029	Thompson, AER 1978
New York City	0.041	Kinnucan, AER 1981
New York City	0.051	Kinnucan, <u>NJARE</u> 1986
New York City	0.011	Liu & Forker, AEW 1989
10 regions U.S.	0.009	Ward & McDonald, 1986
12 regions U.S.	0.003	NDB, 1986
12 regions U.S.	0.010	NDB, 1987
Rochester	0.015	Thompson, AES 1979
Buffalo	0.121	Kinnucan, <u>CJAE</u> 1987
Syracuse	0.022	Liu & Forker, AEW 1989
Albany	0.007	Liu & Forker, AEW 1989
Ontario, Canada	0.044	Kinnucan & Belleza, WP 1989
Ontario, Canada	0.004	Goddard & Tielu, <u>CJAE</u> 1988
<u>Cheese</u>		
New York City	0.059	Kinnucan & Fearon, <u>NCJAE</u> 1986
<u>Butter</u>		
Canada	0.023	Chang & Kinnucan, <u>CJAE</u> 1990

¹ For source citations see references at end of paper.

Source: Compiled by Susan Hurst.

Minimize Cost of Government Programs

I will just touch on a third objective. The legislation that established the national milk promotion program in the United States was developed in part with the objective of reducing the cost of the dairy price support program. The logic is that if advertising can increase demand, then the U.S. government will be required to buy fewer dairy products and government costs will be reduced. In this case, the objective of advertising might be to determine the level of expenditures that will minimize the cost of the price support program.

Maximize Returns to Dairy Farmers

A fourth objective, to maximize returns to dairy farmers, will be discussed in more detail. This is a more complicated objective. You need to consider not only the impact of advertising on the volume of sales and price at retail, but you need to also consider the extent to which the increased revenue at retail gets passed through the system to the producers. In addition, one needs to account for dairy farmers' supply response. Dairymen eventually respond positively to higher prices. This response in turn will result in lower prices which will offset some, but usually not all, of the benefit of advertising.

THE ADVERTISING-SALES RELATIONSHIP

Knowledge about the relationship between the level of advertising investment and sales is essential in determining the "right level" of advertising investment for either of the last two objectives discussed above. The model that is most commonly used is presented in Figure 1. Advertising dollars are used to develop advertising stimuli. The stimuli are designed to increase consumers' awareness of the commodity. Through increased awareness an attempt is made to alter beliefs and improve attitudes. As discussed, the targeted objectives could be awareness, beliefs, attitudes, or sales. The ultimate goal in most cases, at least over the long run, is to increase sales or purchases.

A direct measure of this advertising expenditure/demand response is possible if we take into account the many other factors that affect this relationship (Figure 1). These factors include the quality of the creative work, the means of delivery, culture, individual habits, the price of the commodity, the price of substitutes, the amount of competitive advertising, demographics, and life style. The extent to which advertising expenditures influence consumer behavior, net of all of these other factors that influence consumer behavior, can be referred to as the advertising elasticity. This elasticity, as discussed earlier, can be used to help determine the "right level" for achieving certain consumer-response objectives.

RETURNS TO PRODUCERS

To the extent that we want to determine the effect on producers' returns, we need to consider additional factors (Figure 2). Dairy producers' returns are affected not by the increase in sales at retail, but by the extent to which those increases are reflected in improvement in the producers' milk checks.

The producers' gross returns are affected in the short term by the size of the marketing margins, the Class I price differential, and the extent to which government is in the marketplace purchasing dairy products. In the longer term, producer returns are also affected by the extent to which producers increase milk production in response to improved returns.

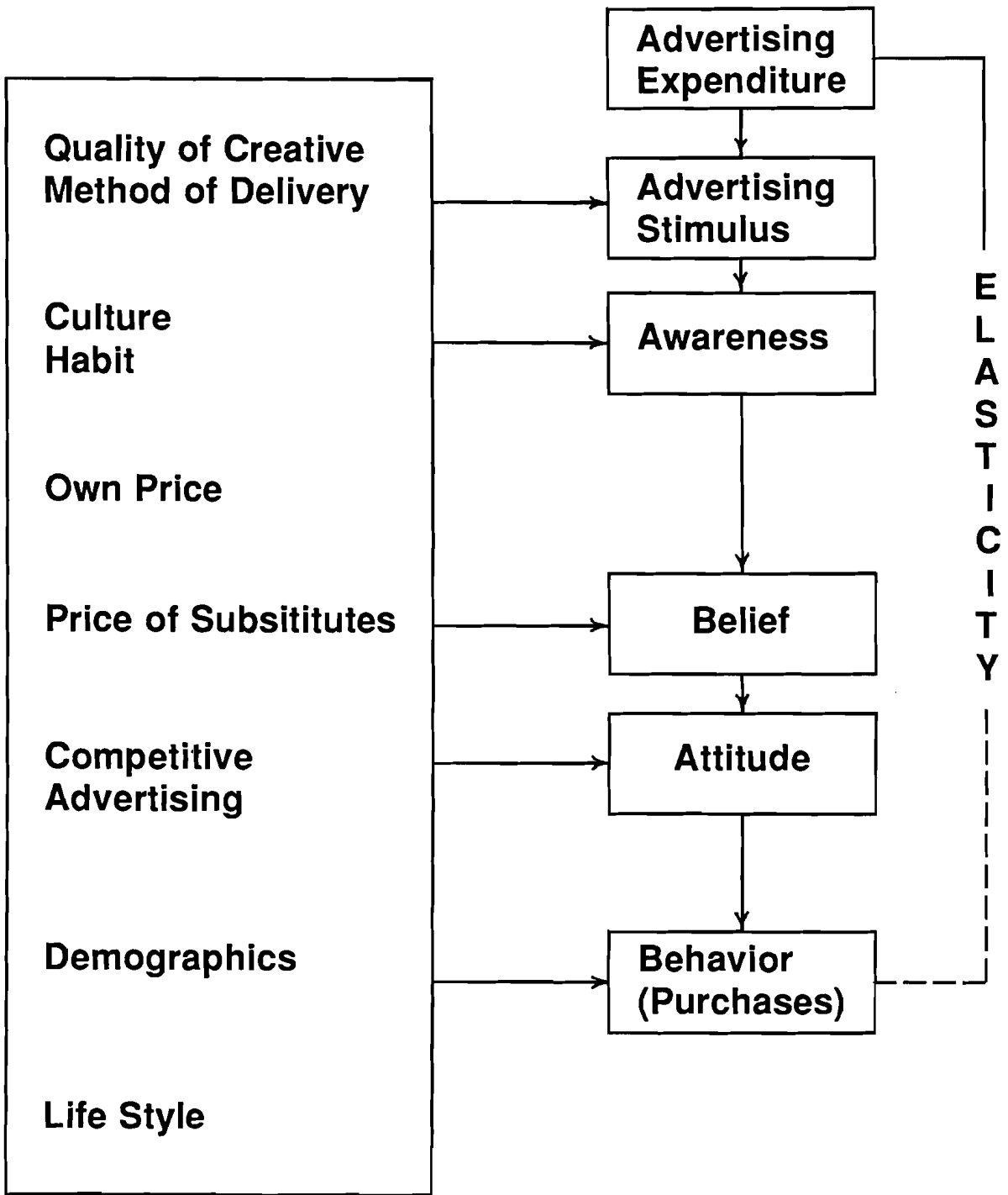


Figure 1. Factors Influencing Consumer Behavior

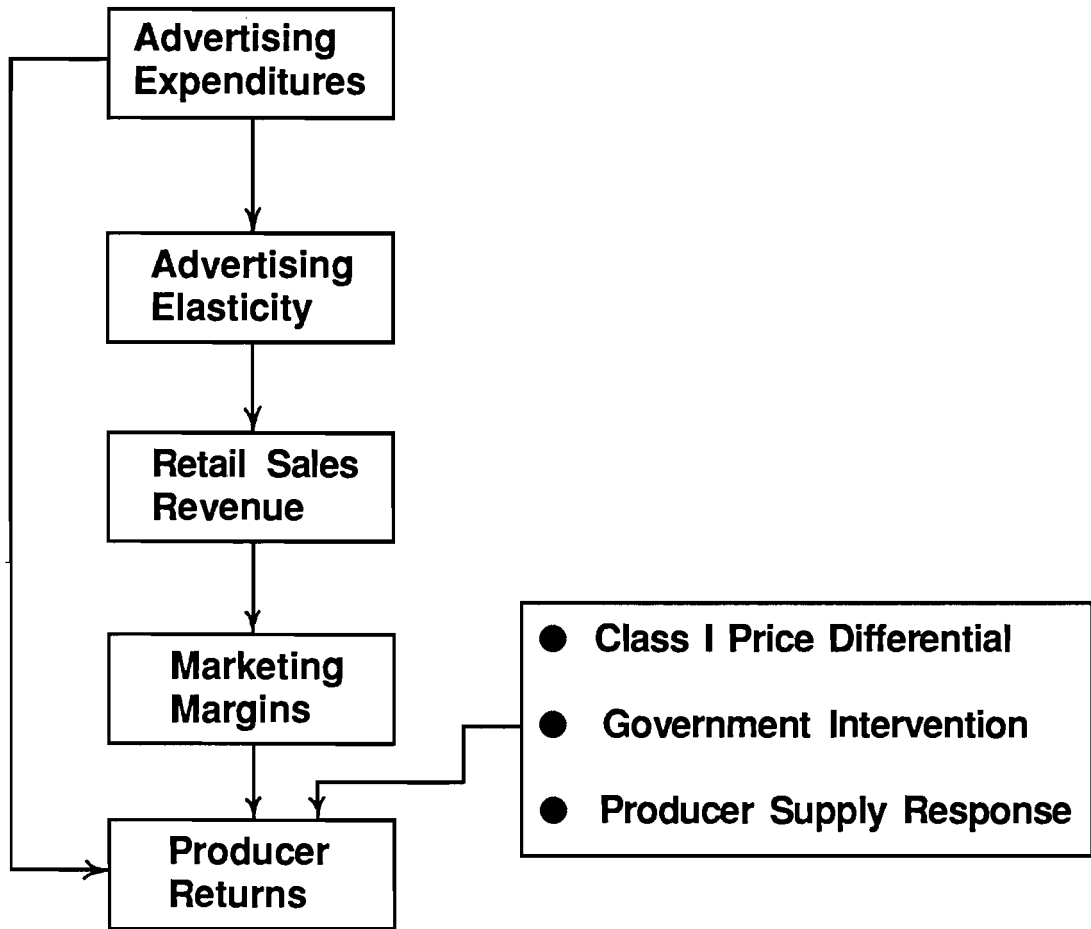


Figure 2. Factors Influencing Returns to Producers

The Class I Price Differential

Let me discuss the issue of the Class I price differential for a moment. The larger the Class I differential, the higher the optimal level. We have a model at Cornell that determines the optimum level of advertising expenditure for fluid milk for three New York cities. When the differential was \$2.20 in the early 1980s, the model suggested that dairymen should reduce expenditures by about 35 percent in New York City. A recent run of that model, with the more current higher differential, indicates that an optimum level would require a reduction of only 11 percent from the actual.

Government Intervention

The extent of government involvement in the marketplace becomes important in considering the right level for cheese advertising. Increases in cheese demand due to advertising will be reflected in increased returns to producers only when the market price for manufactured milk exceeds the government support price and the government is not buying cheese. Under the objective of increasing farmer income, the "right level" is zero when the government is actively supporting the price through government purchases.

Producers' Supply Response

In the short run, a nation's supply of milk is, of course, fixed. Any increase in demand through advertising can only be reflected in an increased price (Figure 3). The stronger demand generated by advertising is depicted as a shift in the demand curve from D to D_A . This results in an increase in price from P to P_A . This is because the supply of all milk is fixed in the short term.³

But over time, producers will respond to higher prices by increasing production. Some argue that the supply response phenomenon indicates that the right investment is zero because no matter how much you expand demand, the increased supply will wipe out any gains from advertising. Nonsense! This is an incorrect conclusion.

If we assume that the dairy industry is an increasing-cost industry, the expanded demand results in a new, higher equilibrium level of production and prices. In Figure 4, the stronger advertising-induced demand is depicted as a move from D to D_A . With supply response, a new equilibrium price and quantity is achieved at P_A, q_A . The gain to dairy farmers in this case is the total shaded area resulting from both an increase in price to P_A and a larger volume of sales to q_A (consumption).

³If one is evaluating the impact of advertising in a regional or local market, the relevant supply is not perfectly inelastic. Under local conditions, milk can be imported from elsewhere, thus we will have a positive supply response.

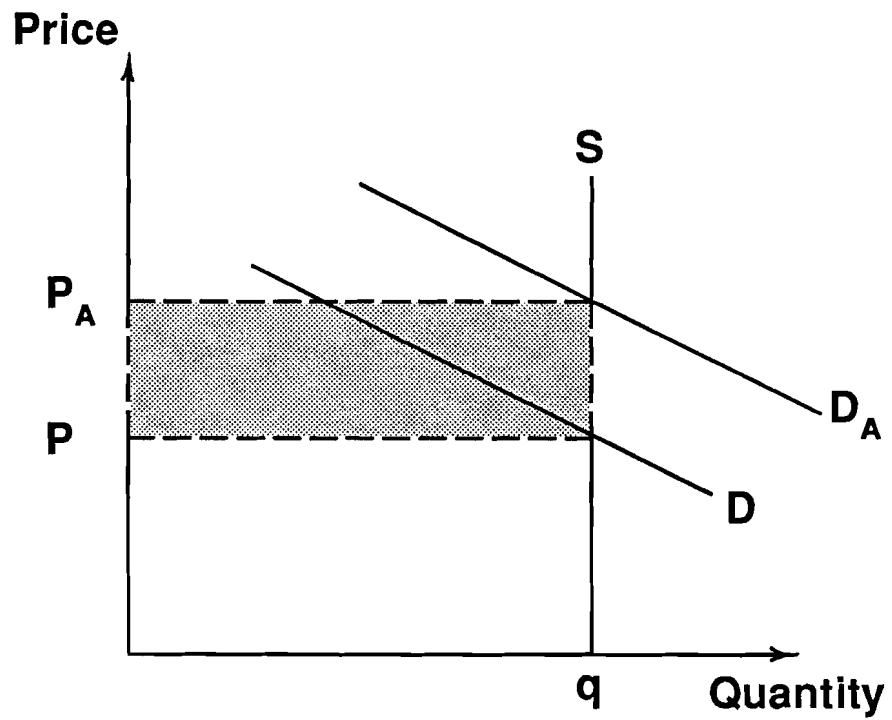


Figure 3. Impact of Advertising on Total Revenue, Short Run Case

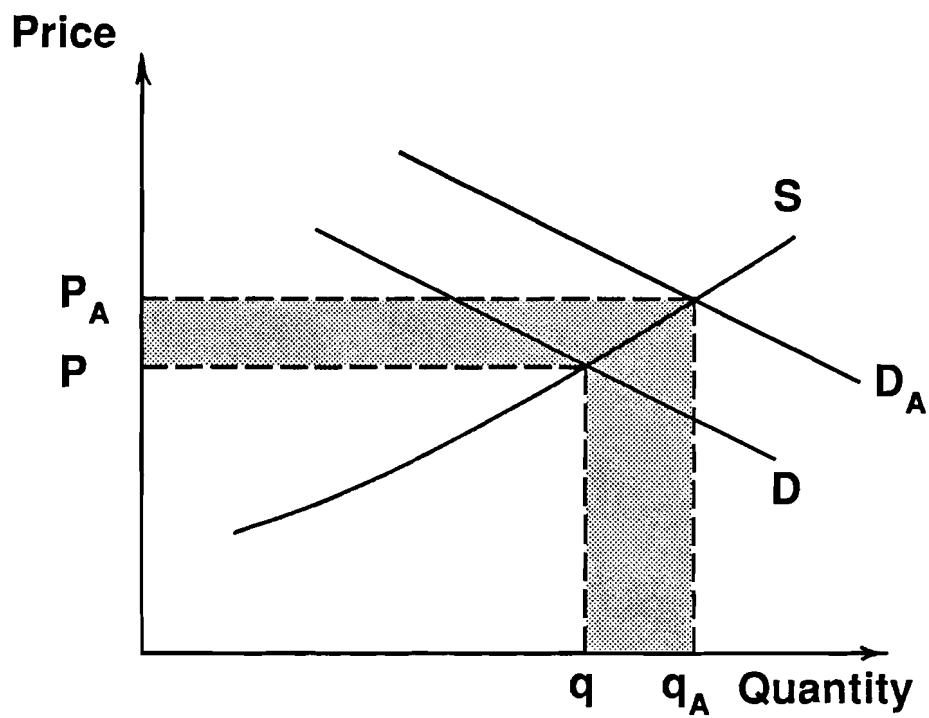


Figure 4. Impact of Advertising on Total Revenue, Long Run Case

THE OBJECTIVE OF MAXIMIZING PRODUCER INCOME

If the objective is to maximize producer revenue, we need to compare this increase in total revenue with the cost of obtaining it. The "right level" in marginal terms is the level at which advertising- induced additional revenue equals the additional cost of advertising required to achieve it.

Based on theory and empirical analysis that has been completed, we believe the nature of the advertising response function to be something like that depicted in Figure 5. Over some level of expenditure, say from a_0 to a_1 , advertising has no impact on sales. This implies a threshold at a_1 that you must go beyond before any impact on consumer behavior is achieved.

Then there is some range of advertising expenditure where returns increase at an increasing rate, a_1 to a_2 . The "right level" is not within this range because marginal revenue will exceed marginal cost over this entire range.

At some higher level of expenditure the rate of return is expected to increase but at a decreasing rate, a_2 to a_3 . It is in this area that we will find the "right level" of investment. Any expenditure beyond a_3 (the area of decreasing returns) is clearly uneconomical.

Within the area of decreasing rates of return, the right level will be where the marginal costs are equal to the marginal returns. This is depicted as A in Figure 5. Net returns are increasing up to this level; beyond this level net returns are decreasing.

Some of the earlier research completed in the 1970s indicated that dairy promotion conducted in the U.S. was still within the area of increasing rates of return. It was obvious from those studies that a larger investment was required to get to the "right level." Studies completed in recent years indicate the level of investment is in the area of decreasing rates of return. Each study provides information as to whether expenditures should be increased or decreased to get to the "right level."

EVALUATION OF CURRENT LEVELS

The challenge to analysts and program managers is to collect the kind of information that will over time help management and industry leaders determine the "right level." Analysts have completed some studies which provide some insight. So let's look at the results of some of these studies.

The rate of return on investments presented in Table 3 are of two types. Those marked with an "A" represent average rates of return and those marked with an "M" represent marginal rates of return. I have included only numbers that are in research reports and have selected marginal rates of return where available.

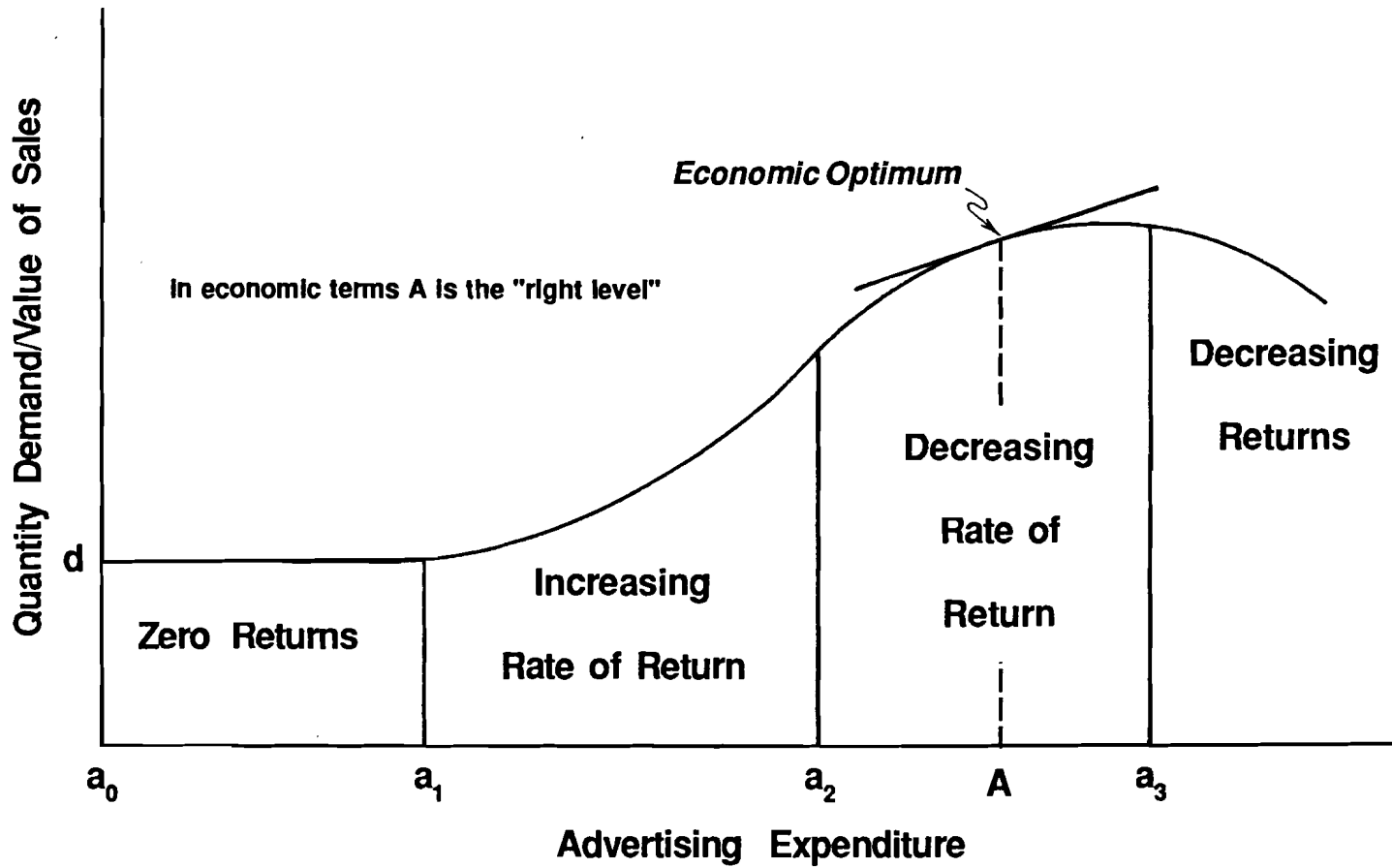


Figure 5. Demand to Advertising Response Curve

Table 3. Return on Investment from Generic Dairy Advertising, Selected Studies

Product/market	Rate of return ¹	Source
<u>Fluid milk</u>		
New York City	\$ 1.11 A	Thompson & Eiler, <u>AJAE</u> 1975
New York City	2.47 M	Thompson, AES 1978
New York City	6.07 A	Kinnucan, <u>NJARE</u> 1986
New York City	1.50 A	Liu & Forker, <u>AJAE</u> 1988
Albany	1.61 M	Thompson & Eiler, <u>AJAE</u> 1975
Syracuse	.40 M	Thompson & Eiler, <u>AJAE</u> 1975
Rochester	1.47 A	Thompson, AES 1979
Buffalo	17.00-22.00 M	Kinnucan, AER 1983
10 Fed. Order	1.85 M	Ward & McDonald, <u>AIJ</u> 1986
<u>Fluid milk/cheese</u>		
New York City ²	11.29 M	Kinnucan & Forker, <u>NJARE</u> 1988
<u>Fluid milk only</u>		
United States ³	7.04 A	Liu et al., AER 1989
<u>Fluid & manufactured</u>		
United States ⁴	4.77 A	Liu et al., AER 1989
<u>Butter</u>		
Canada	1.11 A	Goddard & Amuah, <u>AJAE</u> 1989

¹ A = Average return at actual expenditure level; M = marginal return at actual expenditure level.

² Actual expenditure level with allocation 60 percent fluid and 40 percent cheese. Economic optimum at 3.25 times actual.

³ Return at actual expenditure level for fluid milk.

⁴ Return at actual expenditure level for all products.

Source: Data compiled by Susan Hurst.

All of the studies that are listed here have positive average rates of return and marginal rates of return greater than one except for the study of fluid milk advertising in Syracuse reported in 1975. These numbers indicate that the advertising programs are within the proper economic range. Where the marginal rate of return is greater than one, an increase in investment is justified. Where the average rate of return is greater than one, we can conclude that the returns are greater than the cost of the program, but we do not know

which direction to move to get to the "right level." However, if the number is very large, as in Buffalo and New York City (1986) for fluid milk advertising and as in the U.S. studies, one can reasonably conclude that an increase in investment is justified.

A New York City fluid milk/cheese study yielded a large marginal rate of return at the then current level of advertising, a \$11.29 return for each additional dollar in expenditure. This study provided an optimum allocation of 60 percent for fluid milk and 40 percent for cheese advertising. The economic optimum from that study is 3.5 times the actual level. That study demonstrated that, in part, the "right level" depends on how the funds are allocated across products.

There is also another study which indicates that there is an optimal seasonal pattern of advertising. The "right level" in this latter case depends on how close program managers came to achieving the optimal seasonal pattern.

The United States studies at the bottom of Table 3 indicate high average rates of return for "fluid milk only" advertising and for "combined fluid milk and manufactured product advertising." This study considered the total U.S. promotion program. These high average rates of return lead me to believe that the "right level" for the U.S. as a whole is greater than the \$145 million now being invested annually in media advertising.

We recently completed a study in which we tried to determine the "right level" for fluid milk advertising in three New York markets--New York City, Albany, and Syracuse (Table 4). This study is not listed in the previous table. An evaluation of the fluid milk advertising investment for the period 1980-84 in New York City indicated that the "right level" was 35 percent below the then current level. We studied the three markets using the advertising program of 1984-87. We used an optimum control model which determines the investment level in each market that will achieve the greatest possible returns to New York farmers. The results indicate that the New York City and Albany investments were near optimum, but that Syracuse was well below the "right level." The optimum for New York City was 8 percent below actual. The Albany optimum was 11 percent below actual. The "right level" for Syracuse was 3.27 times higher than actual. With this information, ADADC and the New York Milk Promotion Board decided to test these conclusions. The 1990 media plan for ADADC in New York calls for investments at a level for Syracuse three times greater per capita than in New York City or Albany. We are monitoring this experiment closely to determine whether, in fact, the predicted results will be realized.

Table 4. Optimum Level of Fluid Milk Advertising in, Three New York Markets, Compared to Actual¹

Market	1980-1984 ²	1984-1987 ²
New York City ¹	.65	.92
Albany ¹	--	.89
Syracuse ¹	--	3.27

¹ Optimum level ÷ actual level.

² The Class I differential was \$2.20 per hundredweight in 1984 and \$2.66 per hundredweight in 1987.

Source: Liu and Forker, 1990.

One might ask why there was a difference in the right level between the 1980-84 and the 1984-87 studies for New York City. First, recall that I indicated earlier that the Class I price differential has an impact on the optimum level. The Class I price differential was \$2.20 in 1984 and \$2.66 in 1987. In addition, the cost of advertising increased so that a dollar invested in 1987 bought less advertising than a dollar in 1984. In addition, some other research indicates that the later ads are not as effective, requiring more money to achieve the same results. This combination of factors indicates that the "right level" required more money in 1987 than in 1984.

AN UNCERTAINTY ISSUE

A great deal of uncertainty surrounds the answer to the question of the "right level" of investment. The research that I have discussed is based on the measurement of actual experience, an after-the-fact conclusion. The world of advertising and of food consumption is dynamic and somewhat unpredictable. The results of the research demonstrate that advertising elasticities vary over time and across markets. The quality of the advertising message and the delivery mix have an influence on the impact of the advertising on consumer behavior. And other factors beyond advertising influence the purchase and consumption decisions of consumers, such as price, income, and competitive advertising. All of this creates uncertainty about the actual outcome of any particular advertising program and the level of investment involved.

The degree of uncertainty can be reduced over time as more empirical studies are completed and documented. However, it cannot be eliminated. The ideal is an information loop, where programs are conducted at the level and of the quality that take advantage of the then current information and professional expertise. These programs are then monitored on a continuing basis and the information used to make adjustments in investment level and in program design.

SUMMARY

From my presentation I hope it is obvious that there is no single answer to the question, "What is the 'right level' of advertising investment?" One can, however, conduct economic analysis to determine whether or not the current levels are at, above, or below the "right level" through marginal analysis.

The "right level" for the objective of maximum producer returns will be determined by many factors, including the quality of the creative work that goes into the advertising effort, the method of delivery, the price of the various dairy products, the size of the Class I differential, the extent to which increased margins at retail are passed down through the system to the farmer, and the extent to which producers respond to the strengthened demand.

A review of the studies that have been conducted to date indicate that at current advertising cost rates and price differentials, the "right level" for the United States is probably somewhat higher than the current level. Based on this information one could justify increasing the assessment rate above the current level of 15 cents per hundredweight. Additional studies and studies that are more comprehensive at the national level, however, need to be conducted in order to support this conclusion.

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