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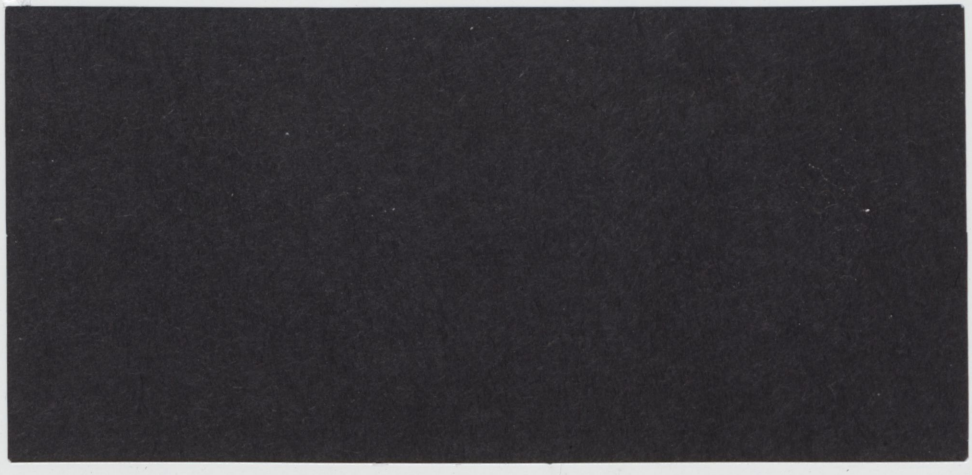

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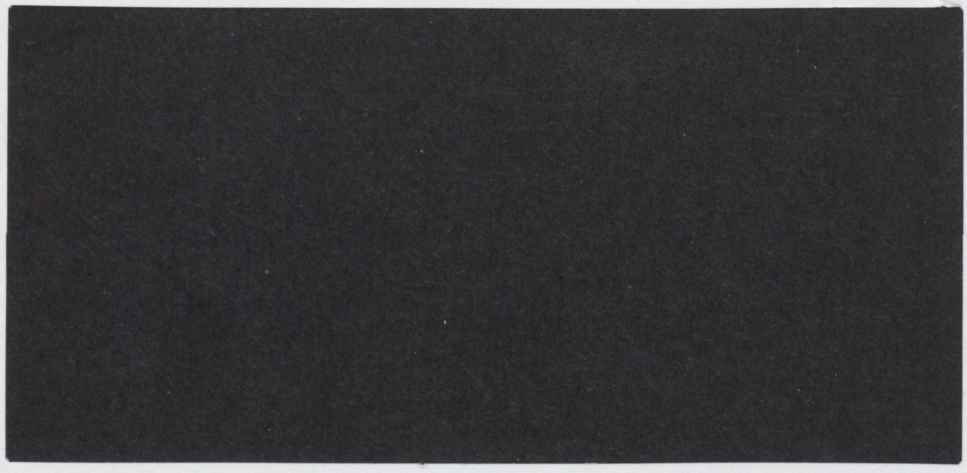

# GENERIC ADVERTISING IN CANADA

(Technical Report #2/96)



by

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# Overview

The paper summarizes theoretical work on the general effects of advertising and the results of empirical applications to generic advertising for Canadian agricultural commodities. The potential impact on demand and prices for different market structures including supply control and active trade. The issue of how changes in welfare should be addressed is also discussed.

The report characterizes the results of generic advertising for pork, beef, eggs, poultry, milk, and butter and cheese in Canada. The range of advertising elasticities (percentage change in quantity demanded in response to a one percent change in generic advertising expenditure) found for each commodity is described. Generally empirical results are significant and indicate very high rates of return to generic advertising all but one commodity studied.

The material presented in the paper suggests that generic advertising in Canadian agriculture has been effective in generating producer profits above advertising costs. The question of social benefit is less clear since consumer surplus measures are not based on a uniform standard of measurement (although they are reported for beef). A positive estimation of ex poste advertising impacts is a necessary condition for further examination of public or private investment in advertising.

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# Introduction

There have been enormous changes in food advertising in Canada over the past twenty years. The Food Prices Review Board produced a publication in 1976 entitled 'Advertising Expenditure and Food Prices'. Their report was aimed at establishing whether advertising had contributed to raising food prices. From their time horizon, food and food product advertising had "increased markedly" over the previous ten years. Excluding generic advertising and breweries "food and food products" had the highest advertising expenditure of any industry, representing 18% of media advertising in 1974.

Since the early seventies generic advertising (conducted cooperatively by all firms in an industry) has assumed a larger place in the marketing strategies of most primary producer groups in Canada. There have been a variety of reasons for this. By the late seventies the national supply management agencies were all in place. These agencies were required under the Farm Products Marketing Agencies Act to conduct advertising as one form of domestic promotion. Simultaneously, concerns about health and nutrition as well as life style changes were affecting consumer's attitudes towards traditionally purchased foods. As farm populations declined fewer people had direct ties to the farming sectors. Family sizes were changing, women were entering the workforce outside the home, microwaves were introduced, international foods were playing a larger role in food purchase decisions. To the dismay of many farm groups, the positions of major commodities in consumer purchase decisions were changing; the most dramatic example of this is the increases in poultry meat consumption simultaneously associated with beef's decline. Similar phenomenon were evidenced in egg sales and in the movement from higher to lower fat dairy products. Media were full of messages about how unhealthy our traditional foods had become (e.g. bacon and eggs appearing on the cover of TIME in the U.S. in the early eighties as a major killer). Commodity organizations responded, in part, by creating and expanding generic advertising programs in Canada.

In some cases, generic advertising activities are facilitated through government organizations. Foodland Ontario for example, has provided cash payments to commodity groups undertaking their own advertising programs as well as providing umbrella advertising for fresh fruits and vegetables. In isolated cases federal funding has been provided to augment generic advertising activities (eg. cheese in the late seventies). Of more significance is the fact that supply management agencies have been allowed to incorporate advertising expenditures into their cost of production formulae under the National Farm Products Marketing Council. Recently the Farm Products Marketing Agencies Act was revised to allow for the creation of national advertising agencies with the power to levy primary producers and importers of product to provide funds for

advertising and research. As well, both advertising and research investments are considered green under international GATT agreements.

In examining the impact of a generic advertising program the first question is whether or not advertising is having an effect on consumer's demand for an advertised product. Without a positive answer to this question no further analysis is necessary. However the second and perhaps more important question is whether the consumer demand impact is capable of putting more money in the advertiser's/producer's pocket; particularly after the costs of advertising are accounted for. This is the heart of the advertising puzzle and perhaps, the area that economist's have most to contribute to.

In the following paper some of the issues that affect a generic advertiser's ability to increase profits through advertising will be addressed. Generic advertising, for the purposes of this paper, is assumed to be advertising aimed at the product of an entire industry. In this paper it will be assumed to be conducted by primary producers (or government agencies) of an advertised product; for example, dairy farmers collectively advertising milk, rather than dairy processors collectively advertising milk. Who conducts the activity and at what market level the generic advertising occurs can impact the optimal level of an advertising investment. The paper is organized into the following sections:

1. What constitutes acceptable confirmation of advertising's impact on demand?
2. How does an impact on demand translate into profits for advertisers?
3. What is the impact of trade on a generic advertiser's ability to generate profit from advertising?
4. What is the interface between government programs and a generic advertiser's ability to generate profits from advertising?
5. What is the impact of market structure on a generic advertiser's ability to generate profit from advertising?
6. What has been going on in Canadian Advertising Programs?
7. How effective have the Canadian programs been?

## Advertising Impact on Demand

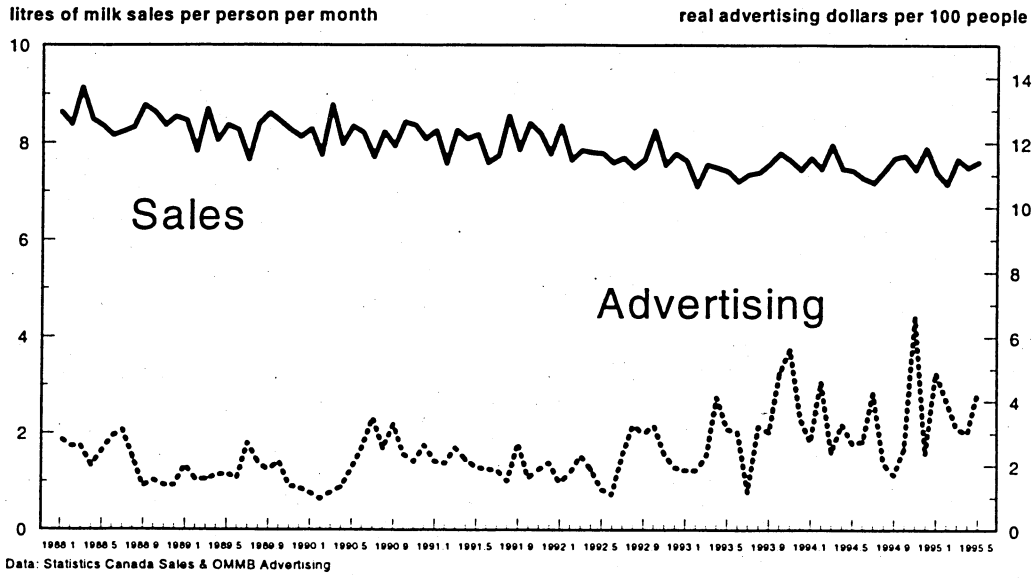
*What constitutes acceptable confirmation of advertising impact on demand?*

The range of advertising response measures is from micro analysis, market research type approaches to macro analysis, econometrics, using long time series data for a particular commodity. In most cases, the micro analysis is frequently undertaken by advertisers. Consumers are constantly polled as to their attitude about a product, their attitude towards a product and their intention to consume and in a long enough tracking study their consumption levels. Researchers often validate ads on the basis of consumer attitude changes and intentions to consume changes. This is a legitimate and perhaps the only way to establish advertising response in the short run. However, in the longer run there are other tools that exist.

Beyond the short term analysis, longer term trends in consumption/sales of an advertised product and the level of advertising can easily be examined. This may lead to a quick assessment that advertising is effective if there is a strong correlation between advertising and sales of the product. The data in Figures 1 and 2 are from two commodity markets in Canada, monthly fluid milk data from the province of Ontario and quarterly beef data from the entire country. When we look at the data we are looking for correlations between advertising expenditure and sales. In both cases it is difficult to obtain a clear assessment of correlation. Even from the graphs it is clear that factors other than advertising are affecting demand for each of these products over time. The clearest evidence of this is the strong seasonality that moves the demand around within a year. There are other economic variables, not illustrated, that are having as big if not bigger impact than advertising and seasonality. The other factors include price, prices of substitutes or complements, income and habit persistence. Only after all factors and their impact on demand are modelled can a concrete assessment of the long run impact of advertising on demand be assessed.

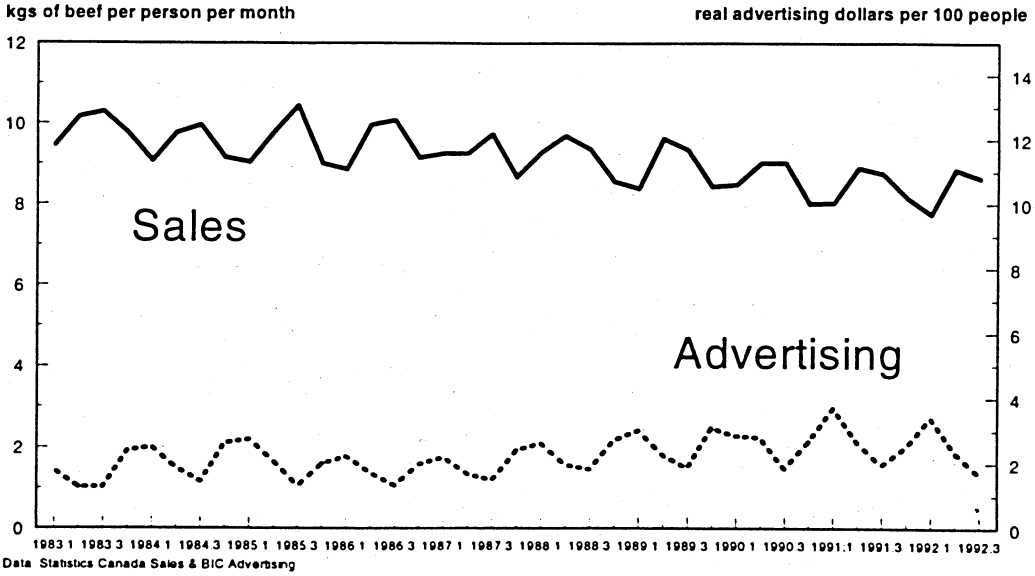
The best data for this analysis is tracking data from controlled experiments over time. The expense of collecting this data is phenomenal. The fall back position is to estimate regressions using aggregate disappearance data for a region or country. Either type of quantitative sales data can be regressed on all possible quantitative variables affecting demand. The level of statistical significance on the advertising variable will provide the first hard data on whether advertising expenditure affects demand. Hopefully the advertising regression coefficient is of the right (theoretically plausible) sign. It is interesting that of the two example sets of data shown in Figure 1 and 2 the fluid milk market responds positively (and statistically significantly) to advertising expenditure in repeated analyses. In the beef market it is more difficult to obtain a statistically significant response to advertising consistently.

**Figure 1: Monthly Ontario Fluid Milk Sales and Advertising 1988:1 to 1995:5**



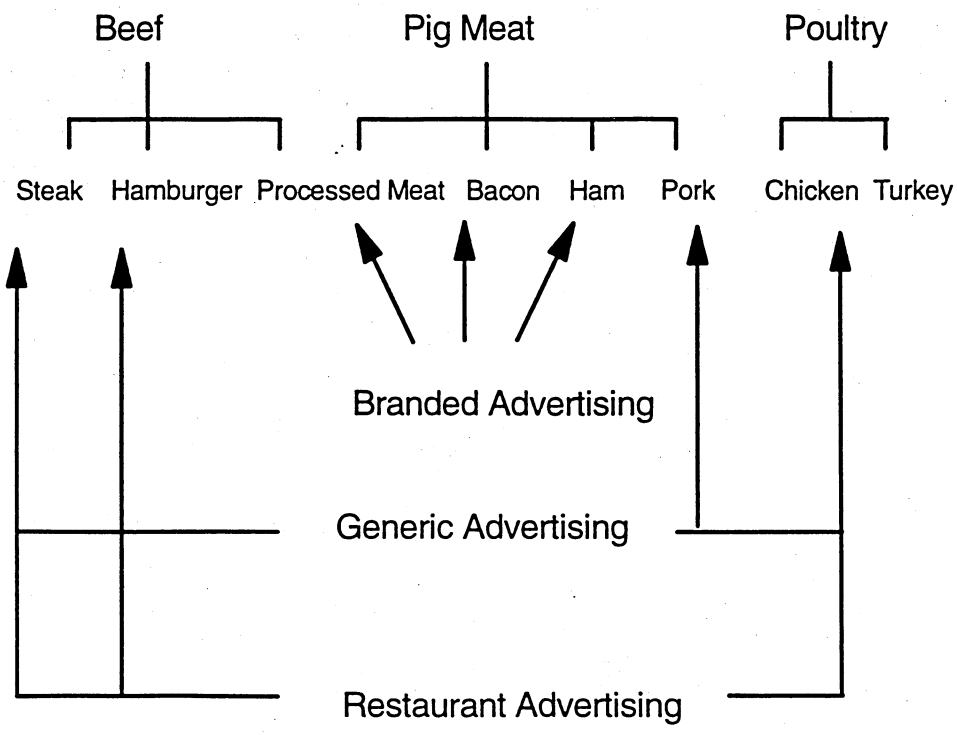

Data: Statistics Canada Sales & OMMB Advertising

**Figure 2: Quarterly Canadian Beef Sales and Advertising 1983:1 to 1992:3**




Data: Statistics Canada Sales & BIC Advertising

**Figure 3: Advertising in the Canadian Meat Sector**




In developing the comprehensive set of variables that would affect the demand for a particular product the range of market activities present should be considered. In most cases researchers would feel comfortable including generic advertising activities of substitute or complement products in any analysis. In analyzing the meat market in Canada there are a variety of advertising activities apart from generic advertising that play a role (see Figure 3).

The importance of brand advertising (increasing total consumption or just affecting market share of branded products), and restaurant advertising can't be overlooked. As well, demands may be affected by nutrition/health research reported in the mainstream press. An example of this in the Canadian context is the "unrealistically" large responses to generic chicken advertising that have been found consistently in previous research. The results may be unrealistically large since the activity is relatively modest and estimates are much larger than those for any other commodity. An explanation may be that restaurant advertising and white meat nutritional recommendation variables have not been included in the model and the generic advertising variable is explaining all of the dramatic increases in chicken consumption over the past fifteen years.

To summarize, an acceptable confirmation of advertising impact on demand can be generated from regression results on either tracking or time series data. As explanatory variables the regression would include:

- Price of product
- Prices of substitutes and complements
- Income
- Seasonality
- Trend
- Generic advertising
- Brand advertising
- Generic, brand and other advertising of substitutes and complements

The regression coefficients provide a quantitative link between variable and sales level. This positive quantitative link is essential if further economic analysis of the advertising effect is to be completed.

Unfortunately the impact of advertising may not be as clear cut as a rightward shift in the demand equation. If life were that simple then results of advertising impact studies would be much more plentiful. There may be no current response to advertising at all. In fact, consumers may need to be exposed repeatedly for the ad to sink in and dramatically change consumption patterns. As well, the expected impact of advertising on demand is never very clear. Model specification tests are essential to establish robustness of results.

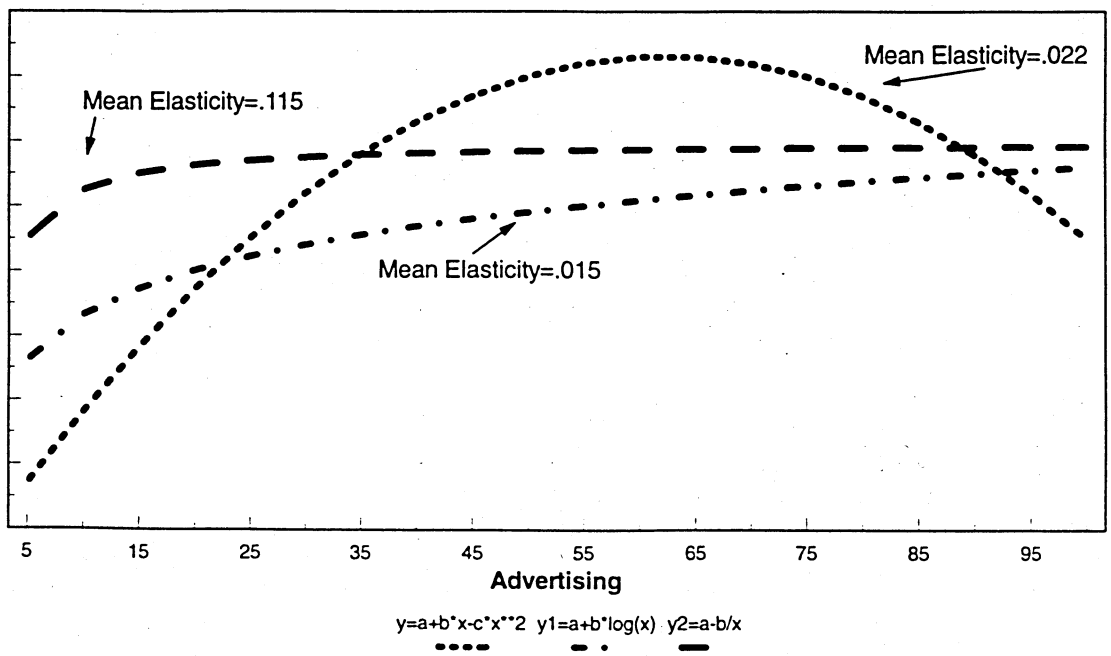
## Modelling the Impact of Advertising

The bulk of the empirical literature on advertising response has been conducted in a single equation format. Within that format researchers have investigated a variety of phenomena.

Simon and Arndt (1980) thoroughly investigated the shape of the advertising response function. In one hundred experiments they consistently found that the advertising response function exhibited diminishing marginal returns. For most agricultural economics advertising literature that follow (eg. Venkateswaran and Kinnucan), model selection has been dependent on the ability of the function to satisfy diminishing marginal returns. A linear demand equation ($Y = a+bX$) would not exhibit diminishing marginal returns in Y to X and is therefore not suitable. In Figure 4, various functional forms that do exhibit diminishing marginal returns are illustrated. The quadratic form allows for negative returns to advertising at sufficiently high levels of advertising expenditure and depending on the size of parameters b and c. Venkateswaran and

Kinnucan (1990) also point out that there may exist a satiation level of advertising (Naples, 1979). Beyond the satiation level consumers do not respond to additional advertising exposure. A double log functional form (log Y = a+b log X) would not be appropriate if the satiation principal were to be a maintained hypothesis.

**Figure 4: Functional Forms**




Venkateswaran and Kinnucan also discuss the possibility that with advertising responses particularly, marginal returns may diminish quite rapidly. If that were to be a maintained hypothesis then the inverse functional form (Y = a-b/X) might be preferred to the semi-log functional form (Y = a+b log X). This is clearly illustrated in Figure 4. Many of the above considerations are empirical in nature and should be tested for rather than imposed without testing. However, the diminishing marginal return consideration is valid, particularly if any optimization is to be undertaken with an estimated model. Optimization requires that the demand relationship be twice differentiable with respect to advertising. Any of the functional relationships illustrated would satisfy the criteria.

Clarke (1976) has provided the most exhaustive assessment of the duration of advertising's effect on sales. He surveyed most of the available literature to that time. In his survey (as well as to date) researchers use either direct lag approaches (incorporating lagged advertising variables directly) or distributed lag models (incorporating lagged dependent variables). His conclusions from his survey were interesting. He compared duration intervals across different periodicities and found that "the average implied duration interval derived from annual data is more than 17 times as long as the average implied duration interval derived from monthly data." A cautionary note is required

when using long run elasticities derived from models where the periodicity does not accurately reflect purchase behaviour (milk purchases are more frequent than annual, for example). Clarke goes on to conclude that "the published econometric literature indicates that 90% of the cumulative effect of advertising on sales of mature, frequently purchased, low-priced products occurs within 3 to 9 months of the advertisement. The conclusion that advertising's effect on sales lasts for months rather than years is strongly supported." A similar exhaustive survey has not been prepared on the more recent literature. In general, most researchers do not explicitly incorporate lags longer than Clarke's analysis would suggest. For researchers lagged effects must be included in any other than annual models.

## Impact of Investment In Advertising Decisions

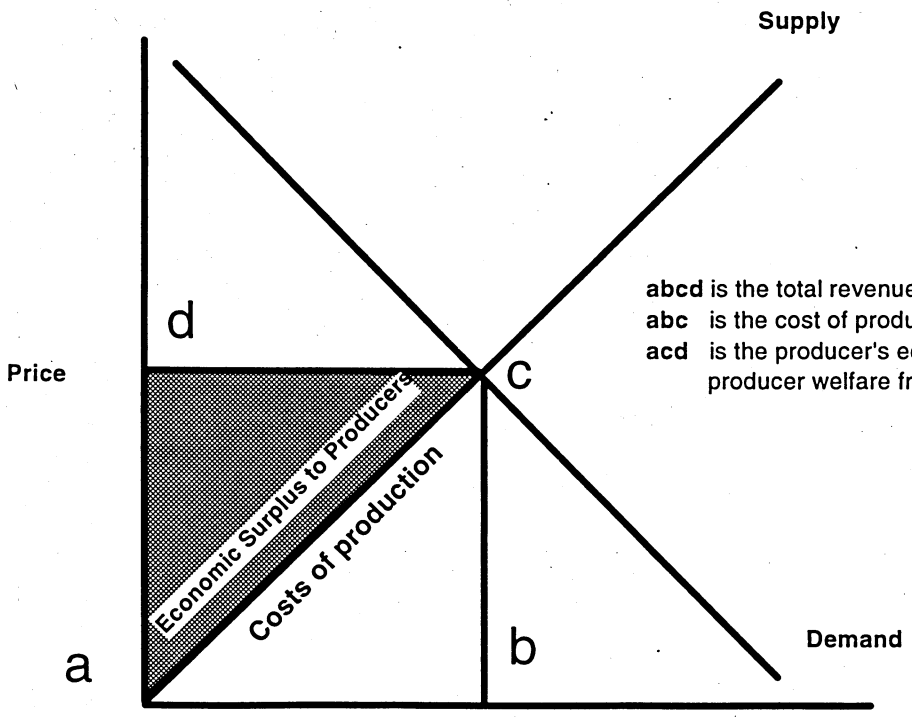
*How does an impact on demand translate into profits for advertisers?*

An understanding of the quantitative link between advertising and consumption is a critical first step for producer groups in establishing whether advertising is an appropriate investment or not. A lack of consistent, statistically significant consumer responses to advertising would suggest an inappropriate investment. However, a consistently positive statistically significant consumer response to advertising is *necessary* but not *sufficient grounds* for sustained or increased investment. Producer groups producing advertising or promotional activities which affect consumer behaviour associated with the advertised good must know that their investment is putting more money in their pockets.

Whether increases in demand actually benefit the producers of the product doing the investing requires further investigation of the marketplace and the market structure of the industry. Determining whether producers actually benefit from increases in demand typically requires an examination of changes in producer welfare. A particular commodity market can be defined in the simplest possible terms as the intersection of simple supply/marginal cost and demand/average or marginal revenue curves. Implicit in this simple definition are the assumptions of a single homogeneous product produced and consumed, no trade or storage and a single market level.

Producer welfare or producer surplus is the total earnings of a supplier over and above the payment that induced the supplier to supply a given amount of produce. Graphically, this is illustrated in Figure 5. In other words, it is the difference between the producer's total revenue at a given price and quantity (abcd) and the cost that would have been avoided if that given output had not been produced (abc). Producer surplus is represented by the 'acd', the total revenue less avoidable costs of production.

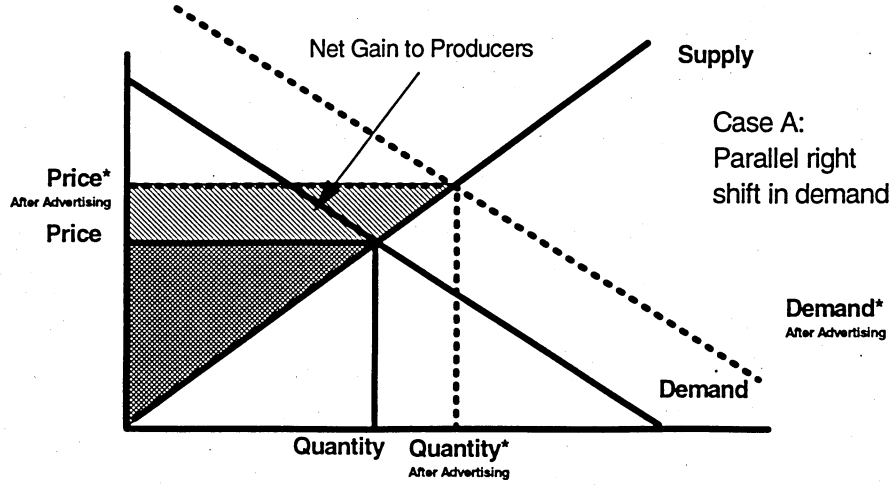
**Figure 5: An Illustration of Producer Surplus**



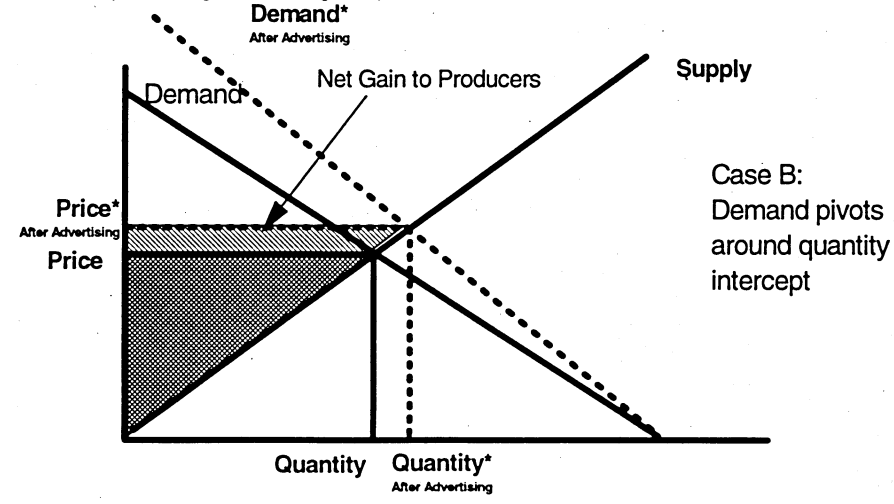

Economic theory, given the simplest of market structures (perfect competition), suggests that if demand is responsive to investments in advertising such that the quantity demanded is increased for any given price then a net economic gain is realized by producers. If advertising is assumed to be effective then any increase in advertising expenditure will change the position of the demand curve. Advertising may provide a variety of different responses in demand. Two obvious ones are demand impacts that pivot the demand curve rather than shift it (Figure 6). As well advertising could change the slope or shape of the demand curve without shifting it at all. The size of producer surplus gains from advertising will depend to a great extent on how the demand impact is modelled.

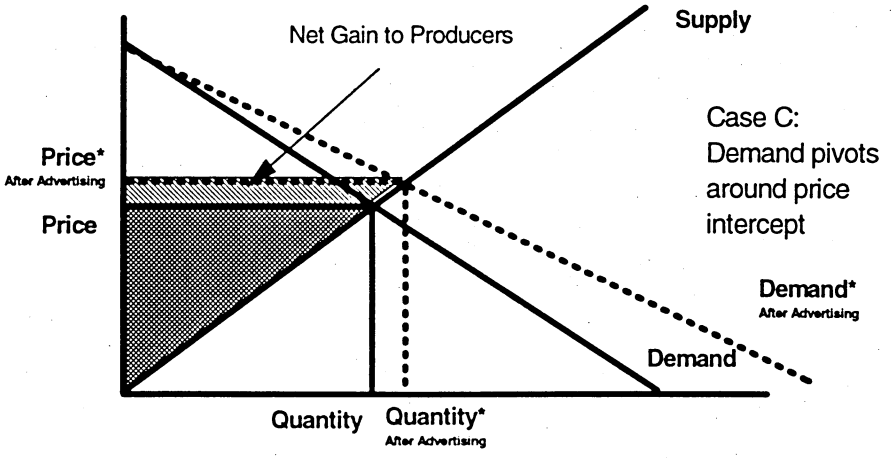
The question remains as to who gains and who loses from the advertising activity. In our simple example there are only two market participants, producers and consumers. The increase in advertising expenditure is shown to result in higher prices, larger quantities sold or both. Thus, there is a producer welfare (producer surplus) gain from the advertising activity if welfare increases more than the advertising investment. However, the question of social welfare changes remains open.

## Figure 6: Investing in Advertising




**The steeper the supply curve the greater the net gain to producers



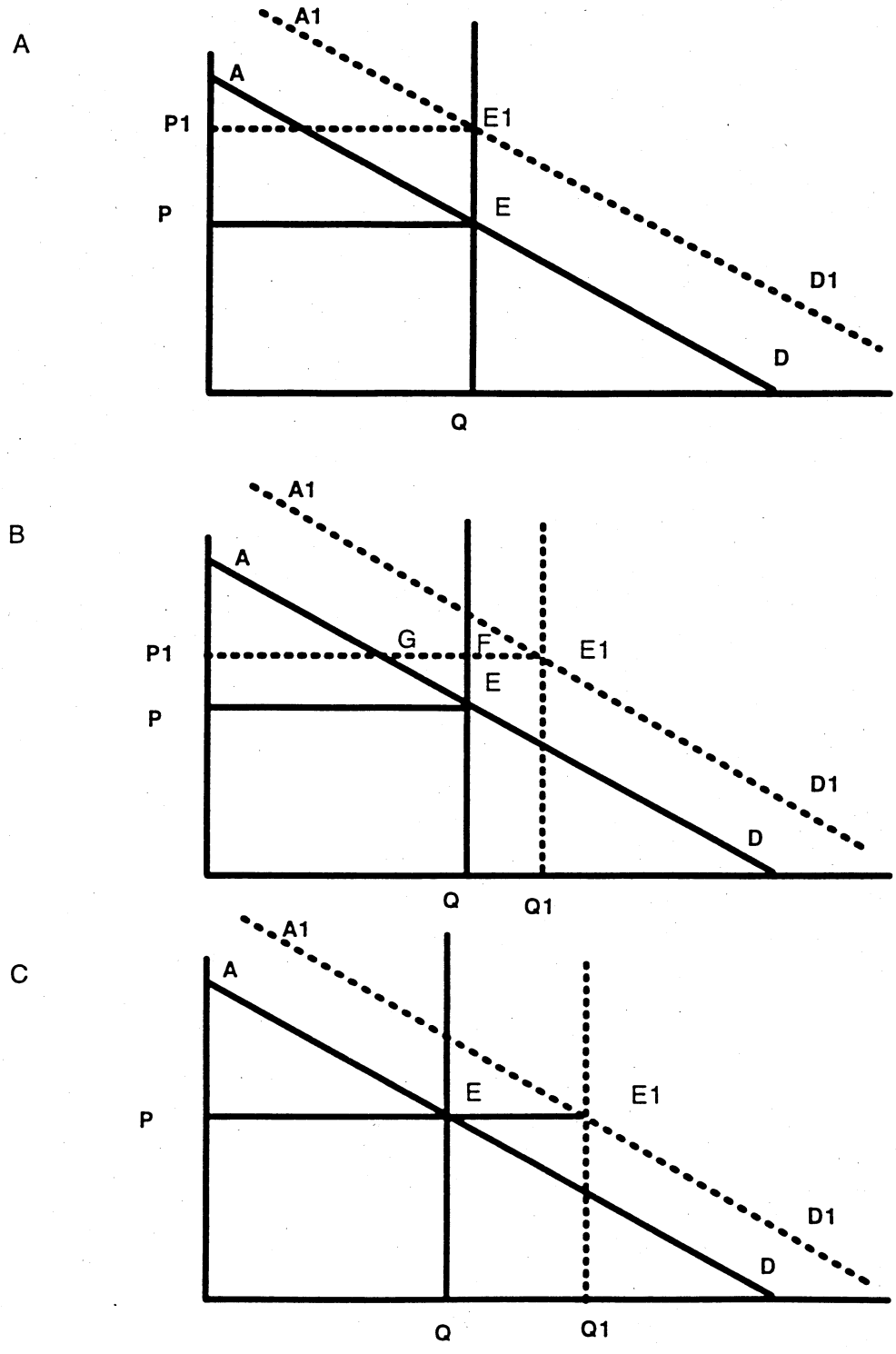
In examining the impact of advertising expenditure on social welfare the interaction between advertising and consumer utility becomes critical. The appearance of advertising in a Marshallian demand function is predicated on the assumption that advertising operates as a shift parameter in the utility function and through utility maximization subject to a budget constraint, appears as an argument in the demand equation for an individual good. If the advertising expenditure operates as a shift parameter in the utility function then pre and post advertising consumer welfare measures are not on the same 'standard' (i.e. they do not refer to the same utility functions). Dixit and Norman (1978) discuss this issue in some detail. Is it then possible to use changes in consumer surplus as a proxy for consumer welfare?

The case can be made more clearly if we examine the case of a monopolist (Figure 7). The three possible scenarios likely to occur from increased advertising expenditure are an increase in price (quantity unchanged (A)), an increase in price and quantity (B), or an increase in quantity (price unchanged (C)). In the first case, producer surplus (P1 P E E1) is increased by the same amount that consumer welfare (as measured by pre-advertising standards) has fallen (the same quantity is consumed at a higher price). Consumer surplus as measured across the two demand curves (A E P as compared to A1 E1 P1) remains unchanged. Summing producer and consumer surplus in this case would suggest a gain in social welfare of P1 E1 E P whereas using a pre-advertising standard would only suggest a transfer of P1 E1 E P from consumers to producers.

In the second case, (B) additional producer surplus (P1 E1 Q1 - P E Q) (assuming MC=0) could be reduced by the decline in consumer welfare as measured by pre-advertising standards (P1 F E P) or the additional costs of consuming the original quantity Q if pre-advertising standards were the appropriate welfare measure. A simple summation of producer and consumer surplus is consistent with the proposition that consumer surplus as measured across the two demand curves has grown from A E P to A1 E1 P1 and that one should add this amount to the producer surplus change.

In the third and final case, (c) producer surplus gains are just equal to consumer welfare losses as measured by pre-advertising standards (E E1 Q1 Q). However consumer surplus across the two demand curves increases from A E P to A1 E1 P and the increase in profit to producers per unit has remain unchanged when simple summations of producer and consumer surpluses are used. In all three cases above, simple summations of producer and consumer surplus overstate the social welfare gains or as Dixit and Norman suggest include "the affect of altering the standard on the value of a given level of output" as well as "the affect of a change in output as judged by a particular standard".

**Figure 7: Welfare Measures**



In empirical modelling work on the impacts of advertising the researcher is left with the dilemma of modelling changes in welfare which on the demand side, at least, are not from a uniform standard (i.e. in (A) the possible empirical measure is A1 E1 P1 and A E P for consumer surplus). The complexity of many of the markets in which advertising occurs makes the determination of the welfare changes based on the pre-advertising or post-advertising standard more complicated than the diagrams would suggest. In all three cases described above, the results from optimizing social welfare across the two demand curves point in the same direction as optimizing welfare from a pre or post advertising measure. For example, in (A) social welfare remains unchanged except through producer surplus changes, in (B) social welfare can be increased slightly over producer surplus changes and in (c) social welfare is increased as producer surplus remains unchanged (per unit).

In certain instances it can be assumed that changes in Marshallian consumer surplus, disregarding the standard of measurement, are a useful proxy for changes in consumer welfare from advertising expenditure. While they will not be equal from a consumer standpoint the direction of change in social welfare (sum of producer and consumer surplus) measures across various optimizing scenarios will be consistent but upwardly biased as compared to those which might have been established more rigorously from a particular utility standard.

To summarize, given a set of assumptions about how advertising affects consumer purchase decisions, an effective advertising campaign could generate higher prices, larger volume sold or both. Clearly an effective advertising campaign has the potential to increase producer surplus associated with the advertised commodity. The case for the generation of additional consumer surplus from the advertising activity is less clear. The additional consumer surplus, if any, is generated from a change in standards or utility rather than from a change in price or quantity along a utility function. Therefore, at a minimum, social welfare increases by a producer surplus increase, while, at a maximum, it increases by producer surplus and consumer surplus changes resulting from a demand curve shift.

An additional concern about the social welfare changes resulting from advertising activity has to do with the overall nature of consumption patterns. Specifically, in the case of generic advertising for food, an increase in consumption of one food can likely only be achieved through reduction in consumption of another. Thus, it may not be relevant to measure social welfare changes in a partial equilibrium framework. In this paper there is no attempt made to not resolve the conceptual issues of consumer surplus and social welfare changes arises from advertising. Instead, familiar techniques are applied with caveats suggesting in some cases that they may not be appropriate.

Even if it is possible to identify the producer surplus or social welfare gains, diagrammatically it must be remembered that the gains are not achieved costlessly. If advertising can be considered a fixed cost then the shaded area minus advertising is a true measure of returns to producers. If, in fact, advertising is considered to be a variable cost of production then marginal cost (supply) also shift as advertising expenditure levels change making producer gains from advertising even harder to measure (Conboy, Goddard and McCutcheon).

## The Effects of Trade

*What is the impact of trade on a generic advertiser's ability to generate profit from advertising?*

In many cases, in the United States particularly, the country's trade position in an advertised commodity is not considered when analyzing the effectiveness of an advertising campaign. In most cases the U.S. is a large enough player in the world market that this assumption may be quite realistic. However, for some commodities and some markets trade cannot usefully be considered exogenous. In the simplest possible case, the classic case of a small country, there are no returns to producers from generic advertising at all. For a homogeneous product produced and consumed world wide, increased local demand will be satisfied through (Figure 8) increased imports, domestic supply and producer profits will remain unchanged.

The real world is probably not quite as simple as that and we are usually faced with unequally sized trading partners, with even the small player able to generate a slight price increase through the international market (Figure 9). This case is similar to the trade in pork (hogs) and to a lesser extent beef (cattle) that occurs between Canada and the United States. The real question that remains for producers in the smaller country is whether to spend their money in the smaller country or to augment marketing activities (Figure 10) in the larger country. Additional producer surplus will be generated in the smaller country under both scenarios. The empirical question remains as to which is best. The trade circumstances for a particular commodity can directly affect returns to domestic generic advertising programs.

## The Interface between Government Programs and Advertising

*What is the interface between government programs and a generic advertiser's ability to generate profits from advertising?*

In simple terms government programs can be classified into two types, those that restrict or enforce domestic production levels and those that enhance producer prices. Examples

of the first may be set aside programs, and in Canada supply management systems currently operational for milk, eggs, chickens and turkeys. Examples of the second may be deficiency payment programs, export subsidies and buffer stock schemes. In the final analysis government costs of administering programs and producer benefits may all be affected by the existence of generic or export promotion programs.

**Figure 8: The Impact of Advertising in a Small Country**

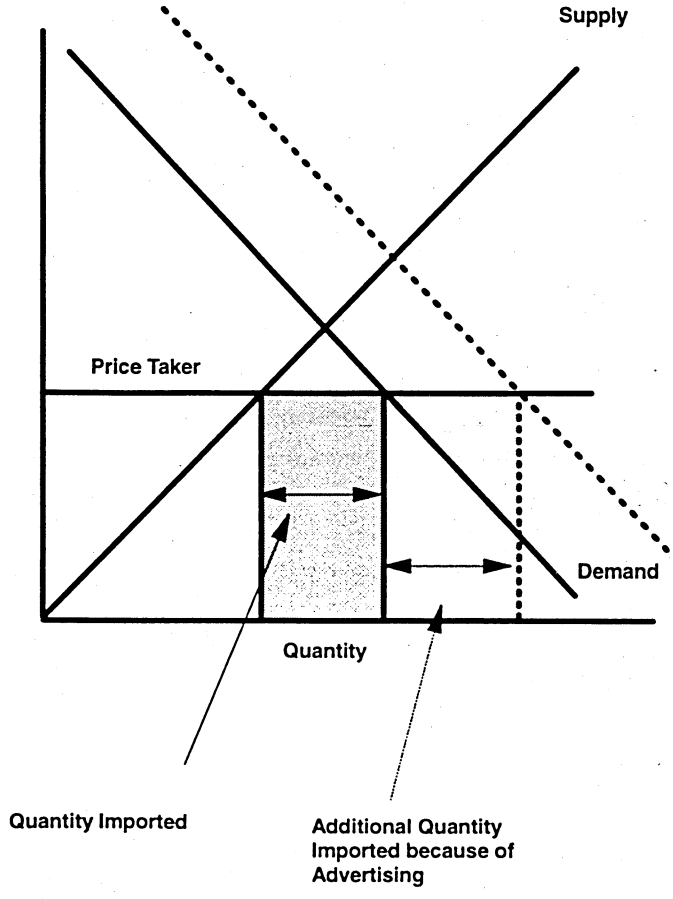


**Figure 9: Impact of Increase in Advertising for a Traded Commodity**

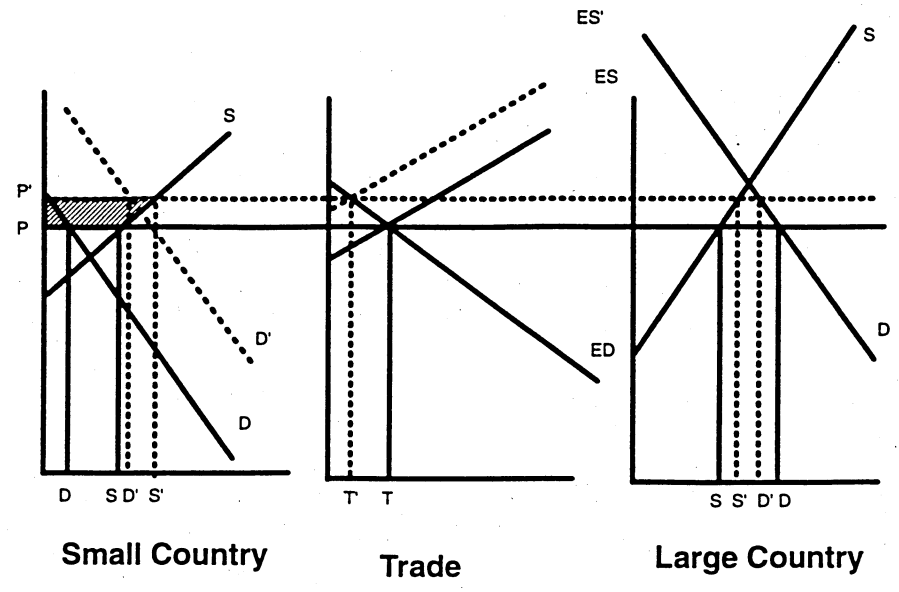
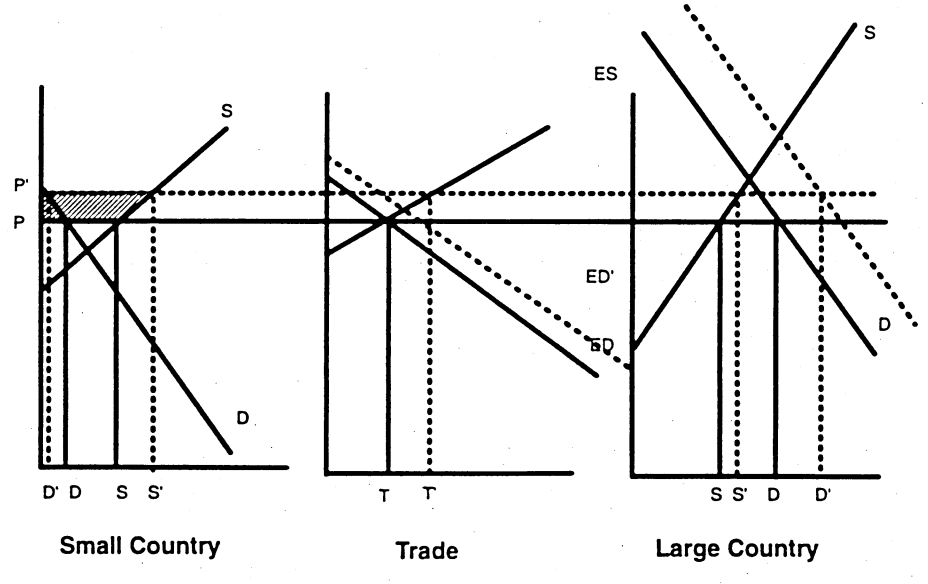



**Figure 10: Impact of Increase in Advertising for a Trade Commodity**



The government programs aimed at enhancing price will not impede the ability of generic advertising to increase producer surplus. Successful domestic generic advertising may in fact reduce the level of export or domestic subsidy required to achieve a predetermined level of producer price (or profit). The government programs aimed at domestic production levels may directly impede the ability of a generic advertising campaign to generate profit for producers. One example of this is supply management in Canada (Figure 11). Producer price is regulated through cost of production pricing formulae. Production quotas are issued (S) to achieve consumption level D with a fixed allowable level of imports (D-S). A response to advertising will result in increased production quota availability and additional profits of ABCD. The total area of profits will only be available to producers if the additional quota is freely distributed and not paid for. The fact that the commodity group may not raise price in response to increased advertising results in a lower return to advertising than would otherwise be the case. This scenario is similar to the operation of the Chicken and Turkey markets in Canada with one major exception. The import share is not fixed but increases as production increases. This has the effect of slightly reducing the available producer surplus to domestic producers from advertising.

A different class of advertising impact occurs when there are multiple priced markets for the output of the supply managed industry. This occurs in the egg and dairy industries. A market with a two priced system would appear as in Figure 12. Production is established and the CoP price established. Any product not consumed at that price is diverted to the lower priced market. Producers are penalized through having to pay for the diversion costs out of their revenues. In such a market an effective advertising campaign could increase producer profits by reducing diversion costs.

Generic advertising programs may enhance market operations and reduce costs associated with running some programs. The operation of certain forms of intervention may impede the ability of some groups to achieve maximum returns from advertising.

### Market Structure

*What is the impact of market structure on a generic advertiser's ability to generate profit from advertising?*

In the real world agricultural commodities are not produced and immediately sold to final consumers. There are many stages of processing and marketing levels that a product goes through. The structure of a particular market may directly impact on the ability of primary producers to generate additional profits from generic advertising aimed at final consumers of the advertised product. A perfectly competitive two market level commodity chain can be portrayed as in Figure 13. Farm level prices are determined where the retailer's demand curve intersects the farm supply curve. Retail prices are

determined where the consumer's demand curve intersects retail supply. An advertising campaign that shifts the retail demand curve may result in higher retail prices and quantities. This result is achieved through increased demand for raw product at farm level and a higher farm level price. Farm level profits from advertising are generated by the difference between the two farm level prices and the additional quantity sold.

Retailers in the simple scenario shown may or may not benefit from the advertising. With a perfectly competitive market they may be no worse off than without the advertising. If market structure (ie. lack of competitiveness) suggests that retail prices increase more than farm prices they benefit. If farm prices increase more than retail prices then retailers lose. The same would apply to other levels of the marketing chain in a more realistic scenario. There is some empirical evidence to suggest that meat packers, in particular, might be somewhat less than perfectly competitive. This situation will affect the level of returns cattlemen can expect from beef generic advertising. Even if the sectors above the farm level behaved as perfect monopolists there would be an incentive to respond to increased demand from advertising and benefits would flow through the marketing chain. Although the level of benefits may be directly affected by the market structure. Given that this is beyond the control of primary producer groups it is not something that needs to be considered in designing an effective generic advertising budget. Certainly different levels of optimal expenditure on advertising would be generated by different assumptions of market structure. Incorrect assumptions about how markets work may result in significant overestimates of returns to producers by economists.

**Figure 11: Impact of an Increase in Advertising Expenditure for a Supply Managed Commodity without Diversion**

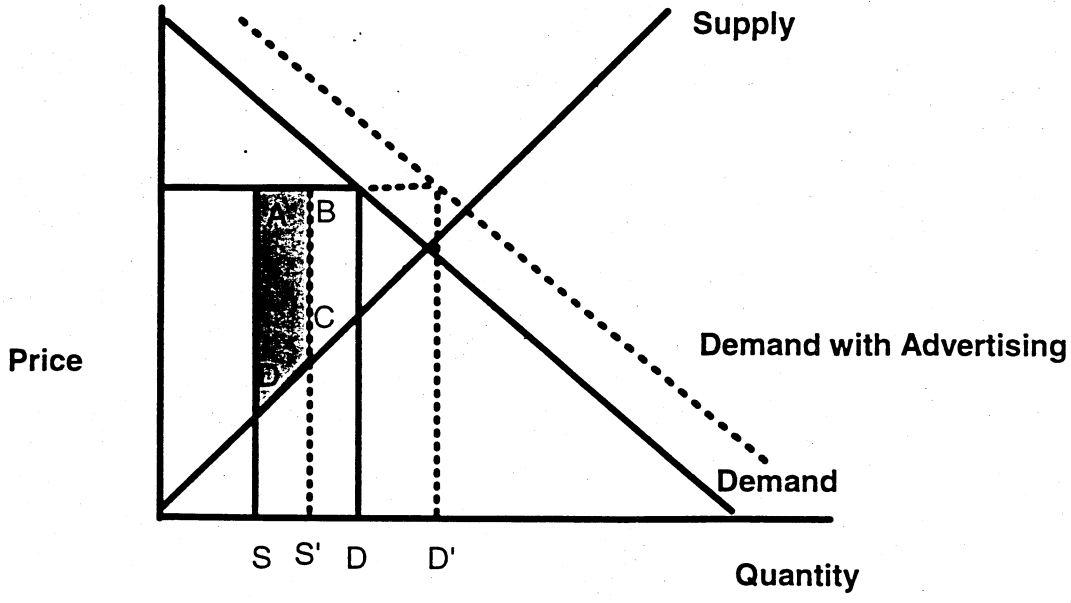



**Figure 12: Impact of an Increase in Advertising Expenditure for a Supply Managed Commodity with Diversion**

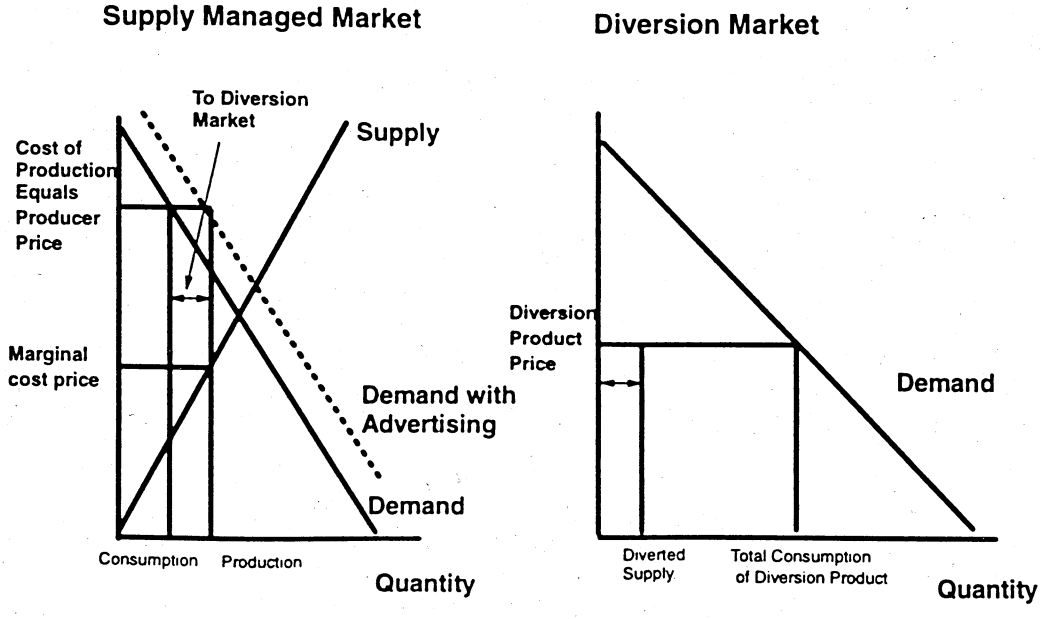
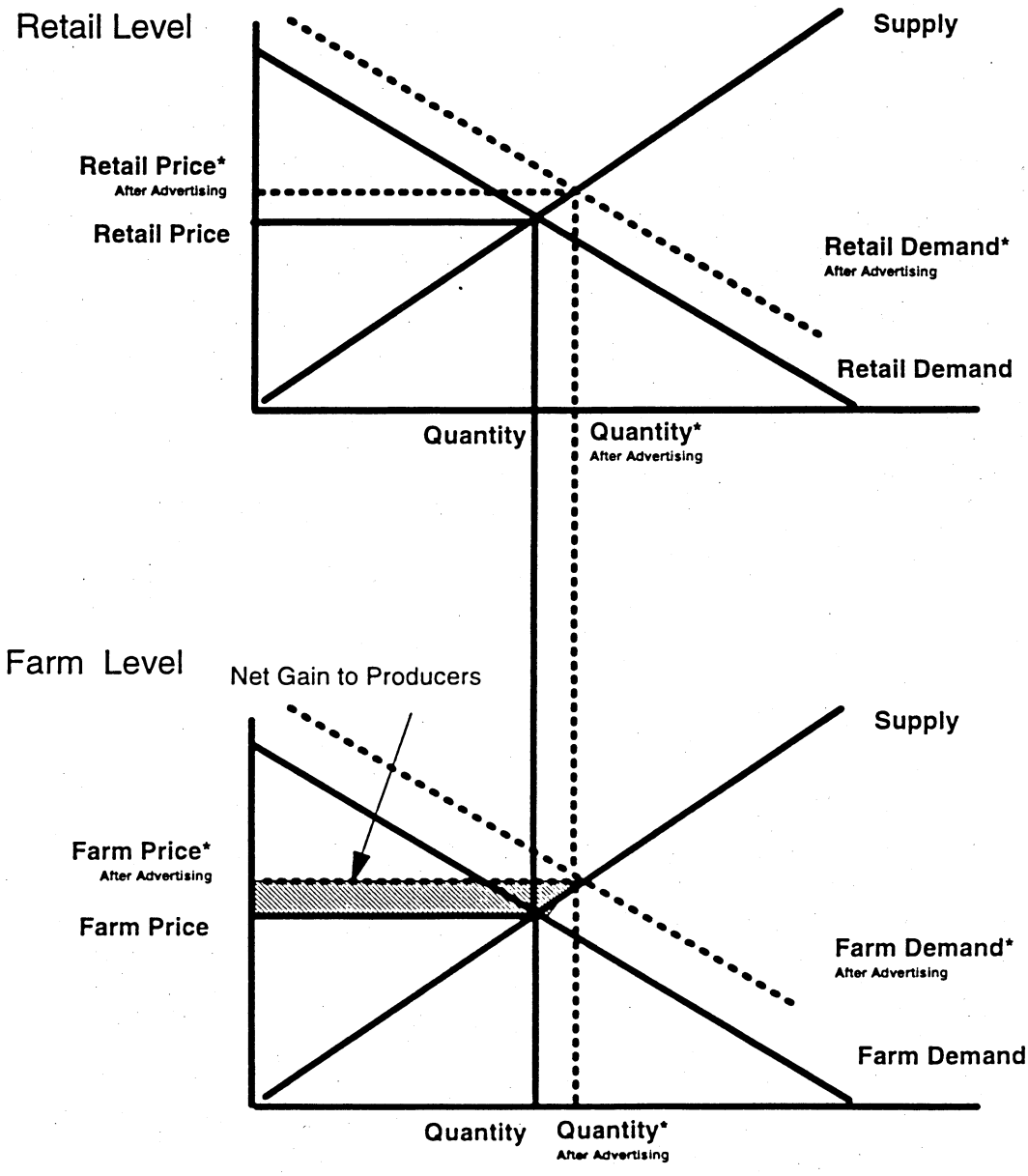


**Figure 13: Marketing Chain and Competitive Structure**



## Update On Canadian Advertising

*What has been going on in Canadian advertising programs?*

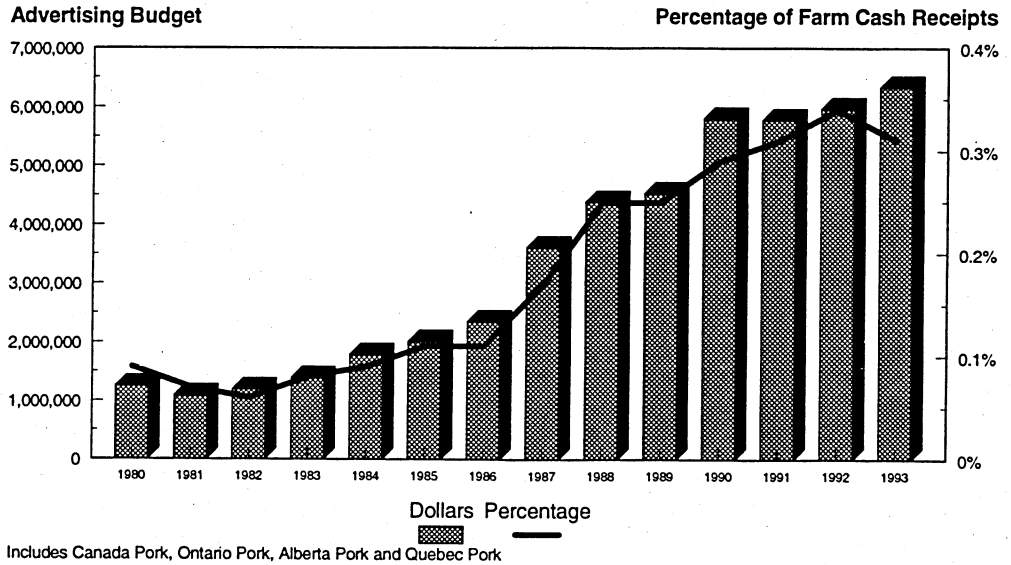
In terms of generic advertising activities in Canada in most cases there has been significant growth in the activity over the past twenty years. Over the last ten years there has been less growth but maintained position for most commodity groups. Brand advertising has been maintained for some commodities and for others it appears that the advent of generic advertising has decreased the necessity for brand advertising (eg. cheese). Data on levels of advertising expenditure (and as a % of farm cash receipts) are provided in Figures 14 through 19 and Table 1. Data on the level of expenditure by branded firms is provided in Table 2. All data are in nominal form.

There is a question about the different impacts brand and generic advertising may have. Brand advertising may or may not cannibalize itself. For example, does advertising by a ham manufacturer only take sales away from other ham manufacturers or does ham demand increase as well? The same question arises when the impact of advertising different pork products arises. Do increased sales of ham result in decreased sales of roast pork or aggregate increased sales of pig products? At an even higher level, does increased pork advertising increase pork sales at the expense of beef or do meat sales increase overall?

There is no immediately obvious answer to the above questions. Theory has little to suggest in the way of prior knowledge about which effects to constrain to zero or not.

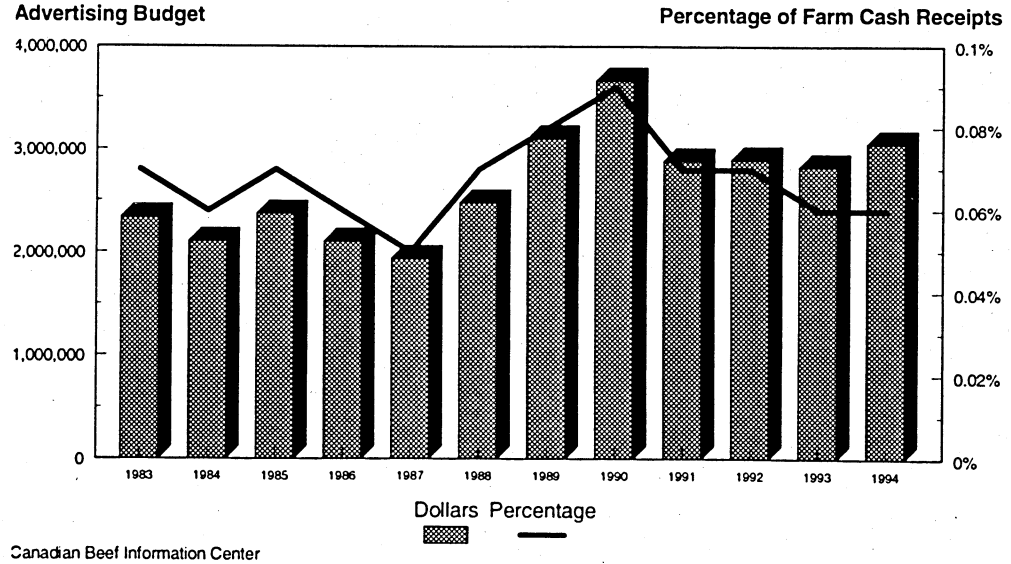
In modelling the impact of brand vs. generic advertising different approaches have been used. Many researchers have excluded brand advertising from their analysis. Some have included it as a separate explanatory variable. Others have attempted to model the demand for the individual goods in a multiple stage model to explicitly test the hypothesis of market share vs. aggregate demand impacts. Duffy (1995) has shown that in the case of individual pork cuts: ham and bacon, advertising affected not only demand for the advertised products but also total expenditure on all pork products. Goddard and Amuah (1989) found that total expenditure on fats and oils was affected by individual product advertising. Goddard and Tielu (1988) found similar effects for beverages in the Ontario market. Cranfield found in a single beef demand equation that generic and brand beef advertising both impacted on beef sales. Thus there is some empirical evidence in Canada to suggest that both brand and generic advertising may be impacting on commodity consumption.

## Figure 14: Generic Pork Advertising in Canada



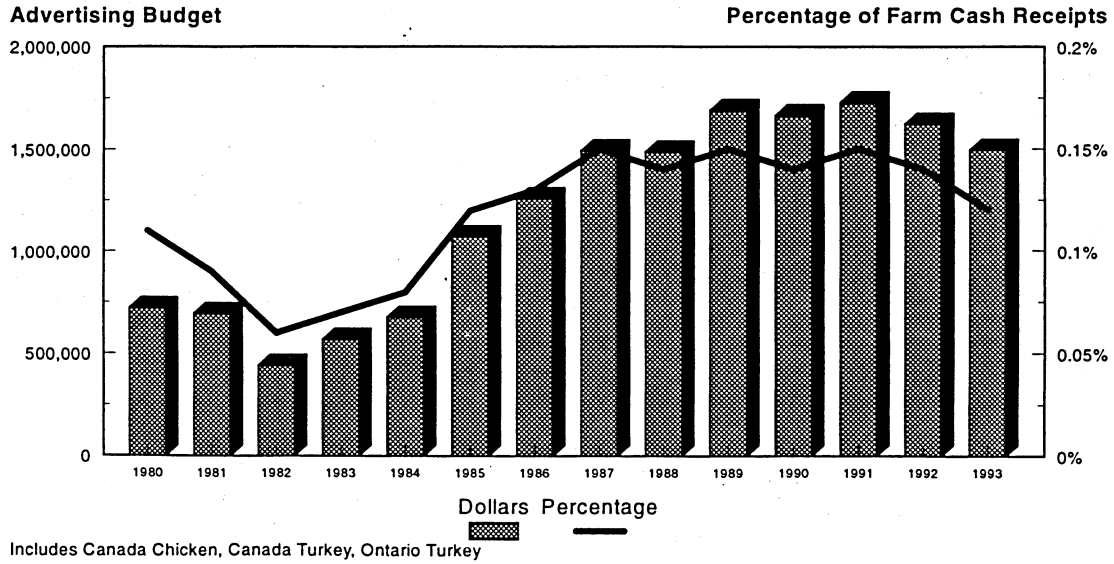

Includes Canada Pork, Ontario Pork, Alberta Pork and Quebec Pork

## Figure 15: Generic Beef Advertising in Canada



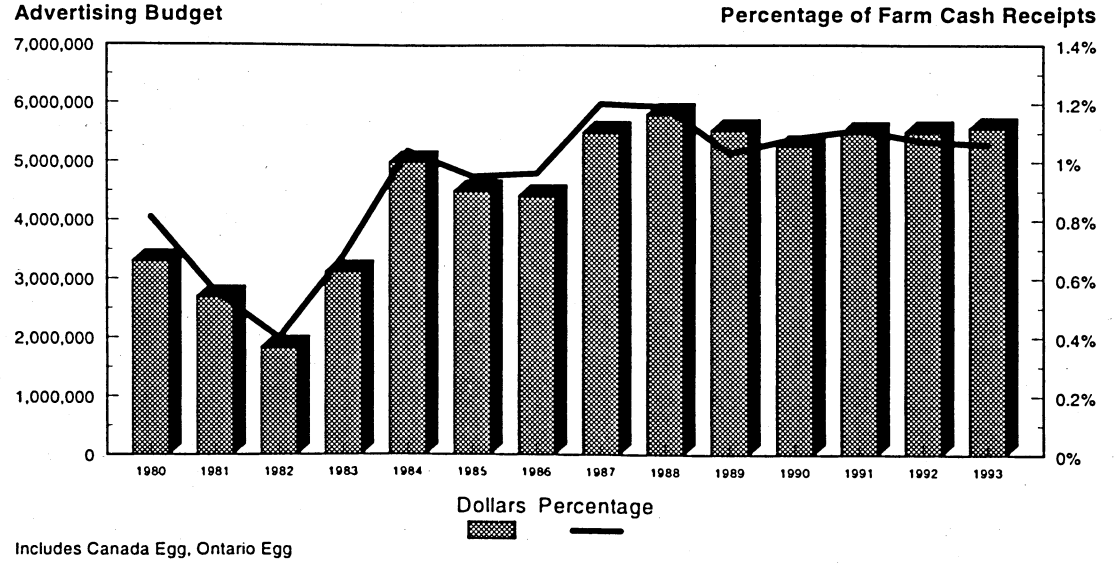

Canadian Beef Information Center

## Figure 16: Generic Poultry Advertising in Canada



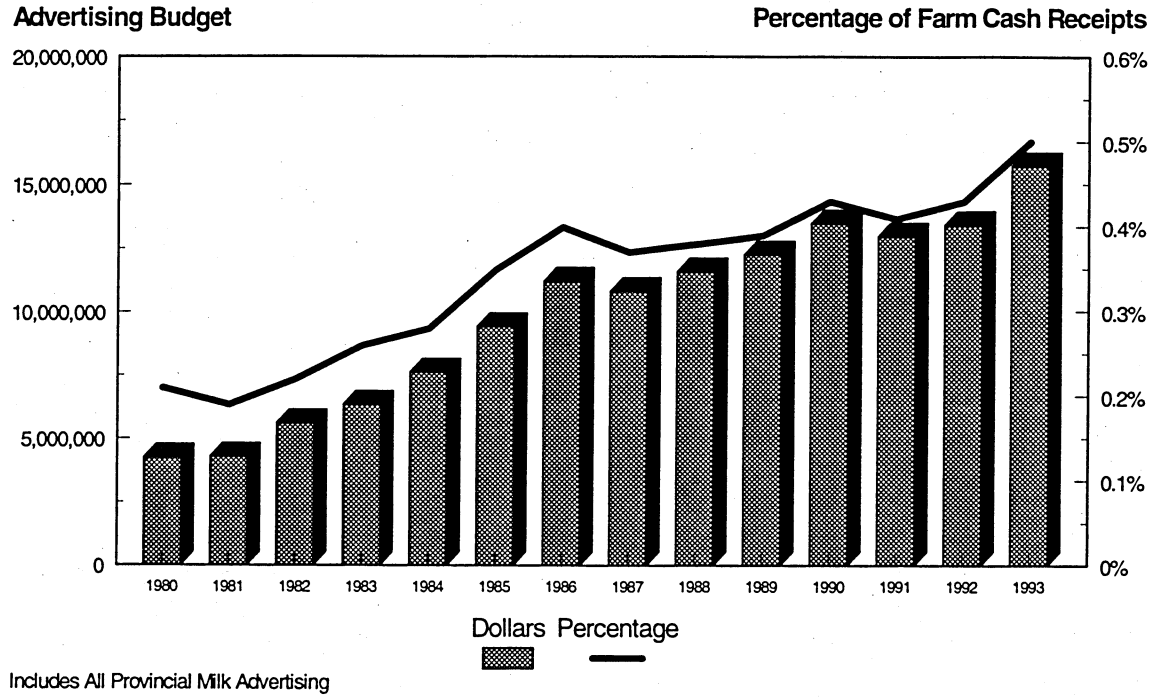

Includes Canada Chicken, Canada Turkey, Ontario Turkey

## Figure 17: Generic Egg Advertising in Canada



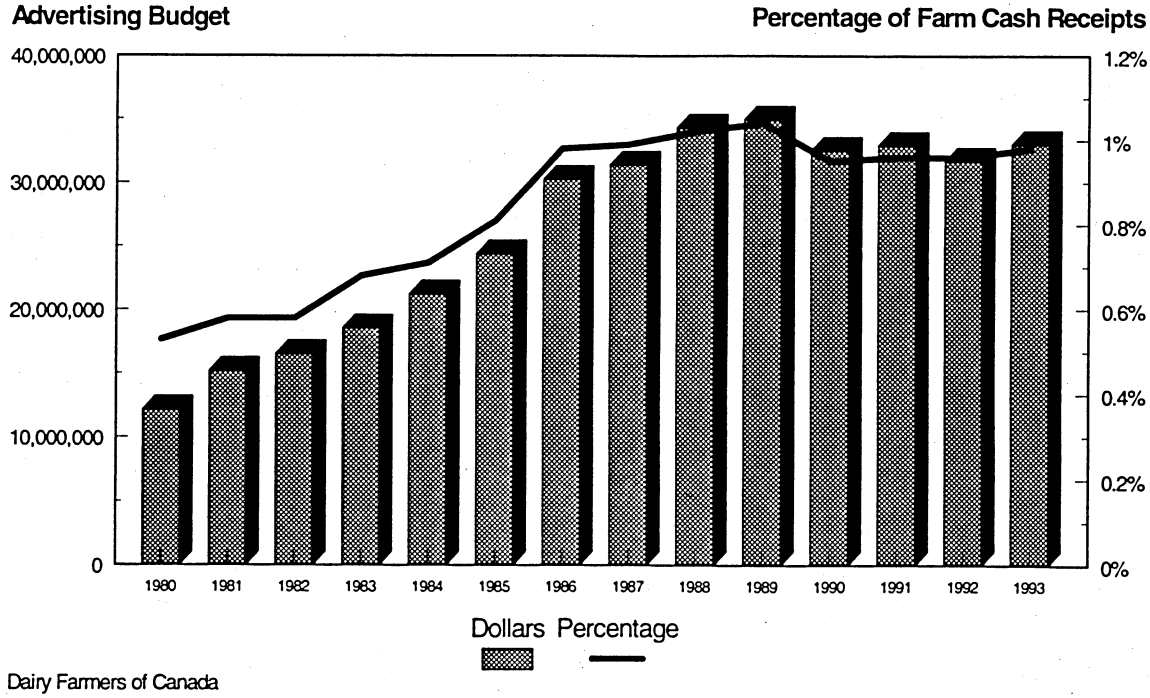

Includes Canada Egg, Ontario Egg

## Figure 18. Generic Milk Advertising in Canada




Includes All Provincial Milk Advertising

## Figure 19: Generic Butter and Cheese Advertising in Canada




Dairy Farmers of Canada

## Effectiveness of Canadian Programs

*How effective have the Canadian programs been?*

Discussion of Estimated Elasticities

In estimating various response parameters for advertising a variety of decisions that can affect the outcome are made. In general, the decisions that can impact the quantitative results include the functional form, or shape the equation is given, the specific variables that are included in the equation, the data definition that is used to describe these variables, the periodicity of the model, the lag structure and the sample period.

With respect to the effectiveness of advertising, to say with confidence that advertising over time has had a positive impact on demand, several conditions must hold. One, the analyses must correctly account for the effect on demand from all other factors such as price, incomes, season, market and policy environments and changes in tastes and preferences that may hypothetically have an impact on demand. Two, if advertising is found to have a positive impact on demand, having accounted for all other factors, the coefficient on the advertising variable must be statistically significant. Three, the impact of advertising must be robust across functional form and sample period. While some variation across functional form and sample period is expected, dramatic changes in sign and significance levels may suggest spurious relationships.

A summary of empirical studies on generic advertising is provided in tabular form in Appendix 1. Not all studies are Canadian. From these studies empirical results for Canada are summarized below.

Estimated elasticities from a variety of studies conducted at the University of Guelph are provided in Tables 3 through 9. These elasticities, by commodity, vary by sample period, by advertising variable data definition and by model specification. With regard to the meat studies (beef, pork and chicken) a variety of different model specifications were tested with the same data set over the period 1972-1989. The advertising variables were total advertising expenditures by various national organizations, Beef Information Centre, Canada Pork (and OPPMB) and Canadian Chicken Marketing Agency, all the data that were available at the time. The results suggest that model specification is particularly important in establishing responses. With the early analysis advertising responses for beef were not robust to model specification and often had "incorrect" signs. Pork responses are relatively robust. Chicken responses are large and consistent except for the AIDS model, large due to the fact that CCMA advertising is so minor and other advertising variables were excluded. Later studies have improved the data definition of the advertising variables and done further model specification tests.

In general, results are consistently positive for pork advertising, with more recent data consistently positive for beef but very small, and positive (but likely overestimated) for chicken.

Egg demand has been found to be very difficult to estimate and derive a theoretically plausible sign on price. Many reported specifications have been price (expenditure) dependent with quantity as an explanatory variable. The price elasticities are very large with this specification suggesting egg demand is close to elastic. With these models advertising is consistently positive and significant in explaining egg consumption. Disaggregating the advertising variable into CEMA vs OEPMB it appears more recently that OEPMB advertising is more effective than CEMA's.

Fluid milk advertising in Ontario is statistically significant whether the model is estimated quarterly or monthly and regardless of sample period. The elasticities fall within a relatively narrow range. Fluid milk advertising in other provinces and in Canada as a whole are also consistently positive and significant.

Butter advertising has not been found to be significant (but correctly signed) in earlier studies. More recent results suggest that butter advertising has a small impact on consumer purchase decisions. Goddard and Tielu have found in model simulation results that perhaps the Dairy Bureau was over-advertising butter in the eighties. As they have pulled back, butter advertising expenditures returns to increased advertising are more positive in the nineties.

Cheddar cheese advertising has been found to be statistically significant across all model specifications.

Various examples of advertising matrices are provided in Tables 10 through 12. Some are derived from the second stage of two stage demand models, the pork matrix is derived across both stages of a two stage model. In general, most of the cross advertising elasticities are not statistically significantly different from zero. The odd elasticity in each matrix is highly significant but it is difficult to know if the signs are correct based on a priori reasoning.

The range of previously estimated advertising elasticities for major Canadian commodities is provided in Table 13. From the author's perspective a reasonable advertising elasticity is also provided in the table.

Producer Returns from Generic Advertising

Various examples of producer surplus from advertising are provided in Tables 14 through 17. These surplus figures are calculated from comprehensive commodity models of each sector, reflecting the existing policy frameworks for each commodity. The measures of return on investment are sensitive to the estimated model specification selected since there is some variability in magnitude of response to advertising.

As expected, if advertising were positive and statistically significant then in most cases producer groups were underadvertising. As suggested previously butter appears to have been overadvertised in the eighties.

## Table 1. Generic Advertising & Promotion Budgets (dollars)

| | Generic Alberta Pork | Generic Canada Beef | Generic Canada Chicken | Generic Canada Egg | Generic Canada ex. Ont Fluid Milk | Generic Canada Butter & Cheese | Generic Canada Pork | Generic Canada Turkey | Generic Ontario Egg | Generic Ontario Fluid Milk | Generic Ontario Pork | Generic Ontario Turkey | Generic Quebec Pork |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1980 | 321,656 | | 10,584 | 2,729,831 | 1,360,738 | 12,136,203 | 0 | 452,142 | 572,000 | 2,889,430 | 928,016 | 257,591 | 30 |
| 1981 | 125,684 | | 8,076 | 2,172,038 | 1,825,585 | 15,175,907 | 0 | 456,371 | 527,000 | 2,464,760 | 960,029 | 229,287 | 3,119 |
| 1982 | 150,022 | | 13,644 | 900,793 | 2,171,702 | 16,504,963 | 0 | 203,676 | 940,000 | 3,439,315 | 1,035,481 | 223,925 | 4,060 |
| 1983 | 389,676 | 2,336,002 | 18,156 | 2,152,414 | 2,536,505 | 18,538,394 | 0 | 321,832 | 970,000 | 3,802,512 | 892,284 | 228,631 | 107,889 |
| 1984 | 269,755 | 2,103,397 | 45,132 | 2,949,832 | 2,954,902 | 21,225,507 | 0 | 361,050 | 2,050,000 | 4,662,102 | 1,080,942 | 270,459 | 435,459 |
| 1985 | 245,093 | 2,369,883 | 94,152 | 2,774,951 | 4,268,752 | 24,367,634 | 0 | 722,356 | 1,720,000 | 5,152,289 | 1,427,889 | 254,963 | 338,326 |
| 1986 | 103,703 | 2,100,364 | 204,624 | 2,907,687 | 5,463,841 | 30,273,908 | 355,123 | 791,505 | 1,506,000 | 5,745,558 | 1,590,635 | 261,836 | 299,780 |
| 1987 | 508,377 | 1,937,785 | 363,660 | 3,304,676 | 5,012,621 | 31,404,984 | 1,106,557 | 856,467 | 2,200,000 | 5,793,979 | 1,526,499 | 272,571 | 471,721 |
| 1988 | 852,893 | 2,479,785 | 406,752 | 3,616,000 | 5,326,694 | 34,303,146 | 1,272,443 | 792,457 | 2,200,000 | 6,257,079 | 1,775,014 | 286,914 | 492,477 |
| 1989 | 622,574 | 3,104,802 | 625,128 | 3,193,000 | 6,748,817 | 34,961,616 | 1,488,870 | 742,113 | 2,344,000 | 5,494,639 | 1,877,822 | 322,645 | 547,265 |
| 1990 | 744,766 | 3,666,726 | 573,468 | 2,766,050 | 6,786,372 | 32,511,948 | 1,994,709 | 754,282 | 2,500,000 | 6,683,997 | 2,112,260 | 336,375 | 957,355 |
| 1991 | 791,420 | 2,887,470 | 265,776 | 4,303,365 | 6,215,636 | 32,915,480 | 2,025,071 | 1,099,994 | 1,190,000 | 6,753,515 | 2,271,987 | 361,239 | 691,462 |
| 1992 | 690,677 | 2,897,960 | 257,220 | 4,075,695 | 6,102,395 | 31,714,068 | 2,082,525 | 1,045,716 | 1,434,000 | 7,316,692 | 2,079,055 | 319,715 | 1,119,812 |
| 1993 | 788,645 | 2,825,000 | 314,028 | 4,100,000 | 5,769,480 | 33,026,032 | 2,043,202 | 824,813 | 1,474,000 | 9,946,257 | 2,131,773 | 355,857 | 1,373,447 |

Source: Annual Report and Personal Communications

## Table 2(a). Branded Advertising Expenditures of Dairy Products in Canada (dollars)

| | Branded Cheddar Cheese | Branded Other Cheese | Branded Processed Cheese | Branded Butter | Branded Concentrated Milk | Branded Fluid Cream | Branded Milk | Branded Milk Powder | Branded Soft Dairy Products | Branded Margarine |
|---|---|---|---|---|---|---|---|---|---|---|
| 1980 | 1,880,513 | 1,509,951 | 3,118,391 | 161,890 | 223,202 | 32,675 | 1,665,059 | 91,495 | 3,105,932 | 8,169,752 |
| 1981 | 2,647,492 | 1,726,193 | 3,573,151 | 185,915 | 258,872 | 99,672 | 934,342 | 68,503 | 2,930,788 | 8,471,063 |
| 1982 | 2,279,702 | 1,627,235 | 4,935,357 | 225,053 | 563,215 | 79,060 | 612,372 | 154,883 | 5,192,034 | 4,175,611 |
| 1983 | 4,710,200 | 1,850,089 | 5,654,535 | 1,017,413 | 840,416 | 219,298 | 129,782 | 29,836 | 7,014,868 | 6,331,213 |
| 1984 | 5,262,409 | 2,269,383 | 9,072,911 | 2,261,802 | 847,372 | 16,176 | 493,149 | 19,660 | 9,376,783 | 7,524,895 |
| 1985 | 3,767,960 | 1,859,100 | 6,805,800 | 1,724,400 | 605,300 | 115,700 | 156,300 | | 9,376,900 | 4,259,400 |
| 1986 | 2,480,200 | 1,891,600 | 4,123,500 | 1,139,100 | 329,000 | 26,900 | 842,200 | 2,500 | 7,720,300 | 5,841,700 |
| 1987 | 2,570,100 | 2,309,200 | 4,149,100 | 279,400 | 138,000 | 64,600 | 701,100 | 22,900 | 5,700,000 | 2,651,100 |
| 1988 | 2,133,900 | 3,842,500 | 4,725,500 | 590,800 | 412,200 | 140,000 | 893,800 | 1,100 | 9,645,400 | 4,166,700 |
| 1989 | 2,907,200 | 4,328,200 | 5,137,900 | 1,950,700 | 654,400 | 320,100 | 1,392,900 | | 9,631,100 | 5,791,600 |
| 1990 | 1,580,900 | 4,404,500 | 6,485,600 | 1,480,700 | 508,500 | 61,800 | 1,049,100 | 6,300 | 6,934,100 | 4,284,300 |
| 1991 | 276,485 | 2,691,633 | 7,016,589 | 1,259,066 | 439,825 | 24,834 | 142,082 | | 7,504,562 | 6,493,940 |
| 1992 | 503,374 | 3,529,882 | 6,788,367 | 765,715 | 1,250,022 | 5,033 | 588,112 | | 5,181,555 | 6,343,407 |
| 1993 | 1,754,500 | 4,865,000 | 6,044,400 | 261,800 | 1,494,900 | 25,800 | 227,200 | | 6,779,500 | 3,332,600 |

Source: Media Measurement Services

## Table 2(b). Branded Advertising Expenditure of Meat Products in Canada (dollars)

| | Branded Sausage | Branded Bacon | Branded Ham | Branded Other Pork | Branded Beef | Branded Chicken | Branded Turkey |
|---|---|---|---|---|---|---|---|
| 1980 | 2,509,407 | 1,032,106 | 1,369,501 | 1,619,823 | 8,942 | 942,090 | 345,420 |
| 1981 | 2,437,814 | 1,460,996 | 1,332,734 | 1,975,795 | 344,710 | 734,831 | 1,281,215 |
| 1982 | 2,478,844 | 1,382,862 | 1,904,793 | 2,647,154 | 67,679 | 422,488 | 156,312 |
| 1983 | 3,998,939 | 2,372,860 | 1,473,400 | 2,440,836 | 51,708 | 981,540 | 564,190 |
| 1984 | 3,295,403 | 1,363,598 | 577,779 | 2,516,498 | 20,533 | 533,467 | 459,144 |
| 1985 | 3,018,200 | 1,488,900 | 123,200 | 2,375,400 | 17,600 | 327,400 | 964,200 |
| 1986 | 4,040,300 | 1,334,800 | 145,900 | 2,403,200 | 263,300 | 14,000 | 489,600 |
| 1987 | 2,600,000 | 1,569,600 | 60,800 | 1,454,600 | 432,050 | 1,300 | |
| 1988 | 3,581,900 | 1,041,000 | 0 | 1,743,600 | 600,800 | 13,100 | 309,300 |
| 1989 | 1,922,800 | 2,136,600 | 1,400 | 2,200,500 | 567,100 | 152,700 | 151,400 |
| 1990 | 897,600 | 950,000 | 1,700 | 1,532,200 | 704,400 | 86,800 | 189,000 |
| 1991 | 729,241 | 560,425 | 2,289 | 1,744,114 | 885,914 | 472,553 | 211,714 |
| 1992 | 1,901,151 | 347,140 | 143,762 | 946,605 | 505,283 | 225,945 | 146,986 |

Source: Media Measurement Services

**Table 3. Comparison Across All Models: Pork** (unless otherwise stated quarterly)

| Model Advertising | Period | Canada Elasticities | |
|---|---|---|---|
| | | Own Price **(sig. at 5% level)** | Own |
| Goddard and Griffith | | | |
| Long Linear (pork adv.) | 1972-1989 | -.32 | .01* |
| Short Linear (pork adv.) | 1979-1989 | -.18 | -.09 |
| Long Linear (All meat adv.) | 1972-1989 | -.30 | .02* |
| Short Linear (All meat adv.) | 1979-1989 | -.10 | -.10 |
| Long Translog (homog.) | 1972-1989 | -.25 | .031* |
| Short Translog (homog.) | 1979-1989 | -.21 | .045 |
| Long AIDS (homog.) | 1972-1989 | -.10 | .016* |
| Short AIDS (homog.) | 1979-1989 | -.15 | .075 |
| Goddard and Chyc (pork adv.) | 1968-1987 | -.83 | .003* |
| Goddard - single equation | 1980-1992 | -.334 | .001* |
| demand system | 1981-1992 | -.40 | .003▲ |
| Duffy - annual | 1972-1992 | -1.19 | .101* |

*significant at 5% level
▲significant at 10% level

**Table 4. Comparison Across All Models: Beef** (unless otherwise stated quarterly)

| Model Advertising | Period | Canada Elasticities | |
|---|---|---|---|
| | | Own Price (sig. at 5% level) | Own |
| Goddard and Griffith | | | |
| Long Linear (1) | 1972-1989 | -.54 | -.003 |
| Short Linear (1) | 1979-1989 | -.47 | -.008 |
| Long Linear (All) | 1972-1989 | -.48 | -.003 |
| Short Linear (All) | 1979-1989 | -.56 | -.008* |
| Long Translog (homog.) | 1972-1989 | -.35 | -.004* |
| Short Translog (homog.) | 1979-1989 | -.40 | 0 |
| Long AIDS (homog.) | 1972-1989 | -.30 | -.004 |
| Short AIDS (homog.) | 1979-1989 | -.28 | .001** |
| Goddard and Chyc | 1968-1987 | -.42 | .001* |
| Goddard - demand system | 1981-1992 | -.36 | .0003▲ |
| Cranfield - annual | 1971-1991 | -.56 | generic .00001*<br>brand .0036* |

* significant at 5% level
**significant at 20% level
▲ significant at 10% level

**Table 5. Comparison Across All Models: Chicken** (unless otherwise stated quarterly)

| Model Advertising | Period | Canada Elasticities | |
|---|---|---|---|
| | | Own Price (sig. at 5% level) | Own |
| Goddard and Griffith | | | |
| Long Linear (1) | 1972-1989 | -.53 | .03* |
| Short Linear (1) | 1979-1989 | -.59 | .02* |
| Long Linear (All) | 1972-1989 | -.54 | .03* |
| Short Linear (All) | 1979-1989 | -.46 | .02* |
| Long Translog (homog.) | 1972-1989 | -.54 | .03* |
| Short Translog (homog.) | 1979-1989 | -.47 | .03* |
| Long AIDS (homog.) | 1972-1989 | -.33 | -.006 |
| Short AIDS (homog.) | 1979-1989 | -.56 | -.002 |
| Goddard and Chyc | 1968-1987 | -.272 | .011* |
| Goddard - demand system | 1981-1992 | -.40 | .032* |

*significant at 5% level

## Table 6. Comparison of Canadian Egg Demand Elasticities

| | | Price | Income | Advertising | Period |
|---|---|---|---|---|---|
| **Goddard** | **Dep. Var.** | | | | |
| Equation 1 | Price | -0.864 | 0.027 | .009* | (a) 1974-1992 |
| Equation 2 | Quantity | -0.215 | 0.034 | .008* | (a) 1974-1992 |
| **Chyc and Goddard** | | | | | |
| Equation 1* | Price | -0.856 | 0.439 | .007* | (a) 1974-1989 |
| Equation 2* | Price | -0.849 | 0.293 | (ad1).012* (pr1).00005 (ad2).008 | (a) 1974-1989 |
| Equation 3* | Price | -0.895 | 0.723 | 0.004 | (a) 1974-1989 |
| **McCutcheon & Goddard** | | | | | |
| - Expenditure Equation | | | | | |
| | Price | -1.12 | -.86 | .05* | (q) 1978-1989 |
| | Price | -2.16 | -.90 | .09* | (q) 1978-1987 |
| Curtin et al. | | -0.07 | -0.35 | | (a) 1960-1985 |
| Van Kooten | | -0.614 | -3.109 | | (a) 1960-1984 |
| Hassan and Johnson | | -0.121 | 0 | | (a) 1950-1972 |
| Andrikopoulos et al. | | -0.545 | 0.417 | | (a) 1958-1981 |

(q) refers to quarterly
(a) refers to annual

ad1 - CEMA advertising
pr1 - CEMA promotion
ad2 - OEPMB advertising

* significant at 5% level

**Table 7. Comparison of Fluid Milk Price and Advertising Elasticities**
(quarterly elasticities unless elsewhere specified)

| Source Elasticity | Advertising Elasticity | Price |
|---|---|---|
| Kinnucan & Forker: U.S. | 0.056 | -0.040 |
| Strak & Gill | 0.002 | -0.207 |
| Kinnucan: Buffalo | -0.0014 | -0.730 |
| Thompson & Eiler: U.S. | 0.004 | -0.203 |
| Goddard & Tielu: Ontario (across two stage demand system)(1971-1984) | 0.028* | -0.246 |
| Goddard & Tielu: Ontario (across two stage demand system)(1971-1990) | 0.007* | -0.413 |
| Kinnucan & Belleza: Ontario | 0.044* | N/A |
| Venkateswaren & Kinnucan: Ontario (1973-1984) | | |
| Double log | 0.0445* | -0.1833 |
| Semi-log | 0.0436* | -0.1926 |
| Log-inverse | 0.0600* | -0.1358 |
| Inverse | 0.0592* | -0.1463 |
| Tielu: Canada (1977-1990) | 0.022* | -0.536 |
| Stonehouse & Kizito: Canada (1971-1988) | | |
| Standard | | -0.011 |
| Low fat | | -0.311 |
| Curtin et al: Canada (1961-1984) | | -0.24 |
| FARM Model: Canada (1970-1980) | | |
| Standard | | -0.022 |
| Low-fat | | -2.79 |

**Table 7** (continued)

| Source Elasticity | Advertising Elasticity | Price |
|---|---|---|
| Goddard & McCutcheon: Ontario (1981-1989)* | | |
| Equation 4 | 0.003 | -0.20 |
| Equation 5 | 0.003 | -0.20 |
| Equation 6 | 0.009 | -0.24 |
| Haack: Ontario (1975-1981) | | -0.21 |
| Chyc: Ontario (1980-1987) | 0.0043* | -0.06 |
| Goddard & Chyc: Ontario (1980-1987) | 0.012* | -.15 |
| Goddard: Ontario monthly (1987:4-1992:10) | .015* | -.383 |
| Goddard: Ontario quarterly (1979-1992) | .011* | -.10 |
| Goddard and Tielu: Canada (1977-1994) | .008* | -.334 |

*significant at 5% level

**Table 8. Fluid Milk Price and Advertising Elasticities Comparison Over Time**

| | ADVERTISING | | | PRICE | | |
|---|---|---|---|---|---|---|
| | Chyc 1979-1980 | Goddard & Chyc 1979-1990(2) | Goddard 1979-1992 | Chyc 1979-1990 | Goddard & Chyc 1979-1990(2) | Goddard 1979-1992 |
| P.E.I. | .006 | .004 | - | -.06 | -.05 | - |
| Nova Scotia | .004 | .005 | .004 | -.38 | -.10 | -.18 |
| New Brunswick | .013 | .016 | - | -.09 | -.09 | - |
| Quebec | .015 | .017 | .016 | -.09 | -.06 | -.03 |
| Ontario | .004 | .012 | .011 | -.06 | -.15 | -.10 |
| Manitoba | .024 | .0001 | .0001 | -.06 | -.09 | -.12 |
| Saskatchewan | .0096 | .006 | .0095 | -.15 | -.13 | -.15 |
| Alberta | .008 | .0001 | .0367 | -.12 | -.71 | -.74 |
| British Columbia | .003 | .059 | .045 | -.09 | -.24 | -.13 |

**Table 9. Dairy Product Price and Advertising Elasticities**

| Dairy Products | Period | | Price | Advertising |
|---|---|---|---|---|
| Butter | Goddard and Amuah | (1973-1986) | -.78 | .010* |
| | Tielu | (1977-1990) | -1.075 | .103* |
| | Goddard and Tielu | (1977-1994) | -.180 | .004* |
| Cheddar Cheese | Goddard and Chyc | (1968-1984) | -.276 | .0031* |
| | Tielu | (1977-1990) | -.834 | .035* |
| | Goddard and Tielu | (1977-1994) | -.15 | .081* |
| Process Cheese | Tielu | (1977-1990) | -.139 | .676* |
| | Goddard and Tielu | (1977-1994) | -.015 | .204* |
| Other Cheese | Tielu | (1977-1990) | -.174 | .145* |
| | Goddard and Tielu | (1977-1994) | -.104 | .008* |

* significant at 5% level

**Table 10. Dairy Product Cross Advertising Elasticities Second Stage Elasticities**
(assuming expenditure on dairy products fixed)

| | DAIRY PRODUCTS | | | | |
|---|---|---|---|---|---|
| | **Milk** | **Butter** | **Cheddar** | **Processed** | **Other** |
| Milk | .002 | .002 | .013 | -.070* | .026* |
| Butter | .006 | .0004 | .038 | -.002 | .166 |
| Cheddar Cheese | .044 | .012 | .063* | -.17 | .059 |
| Processed Cheese | -.030 | .005 | -.092* | .200* | -.036 |
| Other Cheese | .024 | -.011* | .061* | -.070* | .002 |
| Soft Product | .091 | -.016 | -.054 | .058 | -.051 |
| Concentrated Milk | .54* | -.009 | -.14 | -.020 | -.64* |
| Cream | .022 | .0002 | .043* | -.059 | -.022 |
| Skim Milk Powder | -.708* | .011 | -.116 | .760* | .235 |

* - Statistically significant at 5% level.

Source: Goddard and Tielu (1995).

**Table 11. Second Stage Meat Advertising Elasticities**
(assuming expenditure on meats fixed)

| | **Beef** | **Pork** | **Chicken** |
|---|---|---|---|
| Beef | .001 | -.028 | .017 |
| Pork | -.17 | .056* | -.033* |
| Chicken | -.004 | -.041 | .021* |

Source: Goddard 1995.

**Table 12. Both Stages Advertising Elasticities: Pork Products**

| Elasticity of the Dependent Variables | Fresh | Ham | Bacon | Sausage | Other |
|---|---|---|---|---|---|
| Fresh | 0.055* | -0.005 | -0.04 | 0.07 | 0.16 |
| | (2.40) | (-0.34) | (-0.69) | (1.57) | (1.84) |
| Ham | -0.06* | 0.038* | -0.07■ | 0.075■ | -0.07 |
| | (-3.28) | (3.46) | (-1.69) | (1.76) | (-0.92) |
| Bacon | -0.007 | -0.0001 | -0.01 | -0.03 | -0.011 |
| | (-0.58) | (-0.009) | (-0.41) | (-1.10) | (-0.26) |
| Sausage | -0.052 | -0.02 | 0.12 | -0.02 | -0.29 |
| | (-1.12) | (-0.62) | (1.22) | (-0.23) | (-1.63) |
| Other | 0.003 | -0.01 | 0.04 | -0.21 | 0.02 |
| | (0.14) | (-1.42) | (1.05) | (-4.74)* | (0.22) |

Note: Numbers in parentheses are the t-values for the elasticity estimates
Source: Duffy 1995.

* significant at 5% level
■ significant at 10% level

**Table 13. Range of Previously Estimated Advertising Elasticities**

| | Range | Reasonable Assumption |
|---|---|---|
| Pork | .001 - .101 | .01 |
| Beef | -.008 - .004 | .001 |
| Chicken | .01 - .03 | .02 |
| Egg | .0001 - .09 | .007 |
| Milk | .003 - .06 | .01 |
| Butter | .004 - .103 | .01 |
| Cheddar Cheese | .003 - .08 | .04 |
| Process Cheese | .204 - .676 | |
| Other Cheese | .008 - .145 | |

**Table 14. Estimated Return on Investment for Egg Industry at the Mean Over the Simulation Period 1985-1992**

| Advertising Components Reduced to 1% of Actual Levels | Change in Canadian Egg Producer Surplus million $ | Change in Expenditure million $ | Return on Investment |
|---|---|---|---|
| CEMA Advertising | -13.334 | -1.365 | 10:1 |
| CEMA Advertising and Promotion | -22.161 | -2.243 | 10:1 |
| CEMA Promotion | -13.513 | -0.878 | 15:1 |
| OEPMB Advertising | -13.538 | -0.809 | 17:1 |
| CEMA Advertising, Promotion & OEPMB Advertising | -30.823 | -3.052 | 10:1 |

Source: Annual Report prepared for OEPMB.

**Table 15. Estimated Return on Investment for Dairy Industry at the Mean Over the Simulation Period 1986-1994**

| Advertising Components Reduced to 50% of Actual Levels | Change in Dairy Producer Surplus million $ | Change in Expenditure million $ | Return on Investment |
|---|---|---|---|
| Fluid Milk Advertising | -5.981 | -.877 | 6.8:1 |
| Butter Advertising | -.174 | -.600 | .30:1 |
| Cheese Advertising | -3.292 | -.830 | 4:1 |

Source: Goddard and Tielu 1995.

**Table 16. Estimated Return on Investment for Pork Industry**
at the mean over the simulation period 1975-1992

| Pork Product Category | Additional Producer Surplus ('000) | Return on Investment ($) | Additional Processor Surplus ($'000) |
|---|---|---|---|
| All | $14102 | 11.83 | $7803 |
| Fresh Pork | $16384 | 13.74 | $26859 |
| Ham | $19891 | 16.68 | $52612 |
| Bacon | $1407 | 1.18 | $10892 |

Source: Duffy 1995.

**TABLE 17. Consumer Surplus, Processor Profit, Fed-Cattle Producers' Surplus and Cow-Calf Rancher Profits From Each Simulation**
at the mean over the simulation period 1973-1991

| | Base | Generic Advertising of Beef Reduced by 90% |
|---|---|---|
| **Consumer Surplus ($ per person)** | | |
| Canada | 217.33 | 201.31 |
| % Change | | -7.37 |
| U.S. | 424.87 | 425.33 |
| % Change | | 0.11 |
| **North American Processor Profits (US$ '000,000)** | 7042.54 | 6914.49 |
| % Change | | -1.82 |
| **Fed Cattle Producers' Surpus ($'000,000)** | | |
| Western Canada | 621.97 | 606.92 |
| % Change | | -2.42 |
| Eastern Canada | 417.38 | 415.91 |
| % Change | | -0.35 |
| United States | 12160.81 | 12073.15 |
| % Change | | -0.72 |
| **Cow Calf Rancher Profit ($'000,000)** | | |
| Western Canada | 676.87 | 658.69 |
| % Change | | -2.69 |
| Eastern Canada | 131.81 | 127.92 |
| % Change | | -2.95 |
| United States | 7290.35 | 7068.36 |
| % Change | | -3.05 |

* Shows percentage change from Base

Source: Cranfield 1995

# Summary

Accepted practice in most literature on estimating responses to advertising is to specify response functions that exhibit diminishing marginal returns to advertising. A possible specification is $Y = a - b/X$ where X is advertising and Y is sales. The empirical literature does not contain many estimates of cross commodity advertising effects. Those that have been estimated for Canadian generic advertising effects are often zero.

Return on investment to advertising is sensitive to regulatory framework, international trade position and market structure. Cranfield has shown that cattlemen may be better off investing in U.S. generic beef advertising than in Canada given measurable oligopoly power on the part of North American meat packers. Supply management imposes some constraints on the ability of producers to generate profits from advertising, however the inclusion of advertising expenditure as a cost of production gives producers the ability to invest more heavily than they might if advertising were not included. Research results to date suggest that even with the relatively minor position of Canadian hog/pork and cattle/beef sectors in North America, both industries have benefitted from investment in generic advertising. It is worth noting that Duffy used media costs in generating advertising response. Media costs underestimate the total amount of money collected from producers as an advertising levy (which covers administration, production costs and some dead weight losses). In his research accounting for the money collected rather than the money spent on media reduced the benefit cost ratio by a factor of eight. The definition of the variable used to estimate the demand relationship should not necessarily be the one used to estimate return on investment.

# Addendum

In establishing the implications of changing the role of the public sector in advertising it is proposed that "market development benefits" (as calculated for the net benefits calculation) be used as the base. I examined data on the activities included and they are clearly activities that commodity organizations use as part of their marketing plan (these figures are included in the aggregate commodity marketing budget figures presented in Table 1 of the text). As such they are legitimate public investments to look at. However, they are a very minor part of the marketing programs undertaken by most commodity organizations. As such, no explicit return on investment calculations have been done on these activities. As well, in themselves they are an understatement of the total investment in the particular activities. Administration and public personal costs are not included for example.

For most major commodity groups (e.g., milk) the contributions by the public sector have been modest. In analyzing future involvement it would perhaps be advisable to use commodity organization budgets, assume those budgets include transfers from the public sector, and vary the public sector investment around the level of commodity organization investment. Other analysis could include which commodity to invest in (i.e., changing the commodity distribution of public sector funds).

# Appendix 1

| Author | Dependent Variable | Advertising | Lags | Other Variables | Model & Form | Technique | Advertising Elasticity |
|---|---|---|---|---|---|---|---|
| Alston, Chalfont, Piggott (1995) | meat disappearance quantity | own expenditures 1978-1988, quarterly | 3 lags | retail prices | double log LA/AID and AID single demand and system | Maximum likelihood | significant, as expected |
| Ball and Dewebre (1989) | beef, pork, lamb per capita sales | generic advertising 1977-1988, quarterly | no lags | prices of beef, pork, chicken, lamb, seasonality consumer expenditure | linear single demand equation | OLS | beef and pork significant as expected |
| Brester and Schroeder (1994) | beef, pork, poultry per capita sales | generic and brand own expenditures 1970-1991, quarterly | current one quarter lag | prices of meats, consumer expenditures | Rotterdam single demand equation | Iterative SUR | significant and as expected for lagged beef, current pork and current and lagged poultry; lagged pork negative |
| Capps (1995) | meat purchases using scanner data (Q) | print space (sq cm) in weekly flyers Jan 1986-June 1987 weekly | purchases of meats lagged one week | price of meats, price of competing meats, binary variable for holidays, growth trend, binary variable for nearness of payday, seasonality | double logarithmic single equation demand | SUR | as expected and significant except for pork |
| Cranfield (1995) | beef disappearance quantity | generic, brand expenditures 1971-1991, annual | current | beef, pork, chicken prices income, beef, pork, chicken generic and brand advertising | single equation part of market system | Maximum likelihood | brand and generic significant,as expected |
| Duffy and Goddard (1995) | pork, ham, bacon, sausage and other pork product disappareance | own expenditures 1971-1972, annual | 1 quarterly | price, budget share, income, trend | LA/AIDS 2 stage demand | Maximum Likelihood | significant, as expected |
| Funk, Meilke, Huff (1977) | beef weekly sales shipments to store | number of ads in weekly paper Jan. 1974 - May 1975, weekly | | own and competitor beef price, own and competitor substitute prices, own and competitor advertising, seasonality | single equation demand | OLS | significant, as expected |
| Goddard and Cozzarin (1992) | beef, pork, chicken, turkey, eggs, milk, butter, cheese, margarine disappearance | own expenditures 1967-1986, annual | current | price, demographic, income | AIDS and translog single equation | SUR | mixed |

| Author | Dependent Variable | Advertising | Lags | Other Variables | Model & Form | Technique | Advertising Elasticity |
|---|---|---|---|---|---|---|---|
| Goddard and Griffith (1992) | beef, pork, chicken expenditure | own expenditures 1972-1989, quarterly | current | price, income, time, seasonality, lagged dependent | logarithmic 2 stage demand - translog linear equations | OLS and maximum likelihood | pork, chicken significant as expected beef not always signficant. |
| Jensen and Schroeter (1992) | fresh beef sales (Q) | dummy variable representing control /affected groups 1985-1987, monthly scanner data | | household composition, income demographics, employment, quality of meat, own prices, and prices of pork and poultry | linear single equation | generalized least squares | significant, as expected |
| Quagramie and Veeman (1995) | beef, pork, chicken expenditure shares | own expenditures 1982-1991, quarterly | no lags | quantities of meat, income, time, health indices | AIDS | non-linear | mixed results |
| Ward (1993) | beef price | advertising information 1978-1992, quarterly | no lags | quantities of meat, income, time, health indices | log-log (advertising exponential) | non-linear | significant as expected |
| Blaylock and Blisard (1990 | natural and processed cheese per capita sales (Q) entry exit | generic and brand expenditures 1982-1989, monthly | gamma distributed lag | price of natural and processed cheese, price meat, poultry, fish, income, government donations, seasonality and time | log inverse single equation demand | iterative, non-linear | generic significant, as expected; brand insignificant, as expected |
| Blaylock and Blisard (1992) | cheese per capita sales, proportion of households purchasing cheese | generic and brand expenditures 1982-1990, monthly | gamma distributed lag | price cheese, price processed cheese, price meat, poultry, fish, income, time seasonality | log inverse single equation demand | iterative, non-linear | generic significant, as expected; brand insignificant |
| Kinnucan and Fearon (1986) | cheese sales | own expenditures 1977-82, panel | 24 months | seasonality, price, income | log inverse single demand equation | GLS, TROLL | significant, as expected |
| Capps and Moen (1992) | fluid milk products per capita sales (Texas) | own expenditure 1980-1985, monthly | 2 lag radio, 4 lag tv (whole), 3 lag radio, 4 lag tv (lowfat) | own price, price of cola, price of yogurt, income, seasonality, trend | double log single equation demand | OLS | mixed |
| Chyc (1992) | fluid milk per capita expenditures | own expenditures 1978-1990, quarterly | 0,1,2 lags | own price, juice price, income, seasonality, trend, demographics | log-log single demand equation | OLS | significant, as expected |

| Author | Dependent Variable | Advertising | Lags | Other Variables | Model & Form | Technique | Advertising Elasticity |
|---|---|---|---|---|---|---|---|
| Forker and Liu (1986) | fluid milk per capita retail sales (Q) | own expenditures 1971-84, monthly | 2 month lag | retail price, cola price index, earnings of production workers, seasonality | transfer form single equation demand | OLS | significant, as expected |
| Goddard and McCutcheon (1993) | fluid milk per capita sales | own expenditures 1980-1989, quarterly | current | price, price of substitutes, income, seasonality | double log, inverse | OLS | significant as expected |
| Goddard and Tielu (1995) | fluid milk, butter, cheddar, processed cheese, other cheese, soft products, concentrated milk, fluid cream, skim milk total expenditures | generic own expenditures 1984-1994, quarterly | one quarter lagged | income quantity weighted price, demographic, habit formation | translog expenditure share demand system | Maximum Likelihood | milk, butter, cheese significant as expected |
| Goddard and Tielu a (1988) | fluid milk and nonalcoholic beverage in aggregate expenditures (P*Q) | each beverage expenditures 1971-84, quarterly | 1 period lagged dependent variable | weighted price of all beverages, disposable income, seasonality, habit formation | log linear and translog 2- stage demand system | OLS and SUR | significant, own as expected cross mixed |
| Goddard and Tielu b (1988) | fluid milk and nonalcoholic beverage in aggregate expenditures (P*Q) | each beverage expenditures 1971-84, quarterly | 1 period lagged dependent variable | weighted price of all beverages, disposable income, seasonality, habit formation, demographic factor (age) | log linear and translog 2-stage demand system | OLS and SUR | significant, as expected |
| Kinnucan (1987) | fluid milk per capita sales (Q) | own goodwill Jan 78-June 81, monthly | 6 month ad lag | seasonality, per capita income, real retail price, price of substitute beverage, trend | log and log inverse single equation demand | OLS | significant, as expected |
| Kinnucan and Belleza (1991) | fluid milk per capita fluid milk sales | own expenditures 1973-1984, quarterly (tracking and actual data) | 1 period lagged dependent variable | retail prices of milk, orange juice, income, age, seasonality | double log single equation demand | OLS | significant using actual advertising data, insignificant using tracking data estimates |
| Kinnucan and Forker (1986) | fluid milk per capita sales | own goodwill 1971-80, monthly | Pascal distribution goodwill 6 month | seasonality, per capita income, retail price of milk, cola price, coffee price, race, trend | double log single equation demand | OLS | significant, as expected |

| Author | Dependent Variable | Advertising | Lags | Other Variables | Model & Form | Technique | Advertising Elasticity |
|---|---|---|---|---|---|---|---|
| Liu and Forker (1988) | fluid milk retail sales (Q) | own expenditure 1971-1984, monthly | 2 month lag in production of consumer information (Check) | milk, retail price, cola price, weekly earnings, seasonality | single equation demand | non linear least squares | significant |
| Strak and Gill (1983) | fluid milk, cream, butter, cheese per capita deseasonalized milk sales | own expenditure (MEAL data) 1976-1979, monthly | Almon polynomial degree 2 on advertising , 12 period lagged dependent variable | price of milk, income dummy weekend and bank holidays | double log single demand equation | GLS | significant, as expected |
| Strak and Gill (1983) | fluid milk, cream, butter, cheese per capita deseasonalized milk sales | own expenditure (MEAL data) 1976-1979, monthly | Almon polynomial degree 2 on advertising, 12 period lagged dependent varialbe | price of milk, income, dummy weekend and bank holidays | double log single demand equation | GLS | significant, as expected |
| Thompson (1978) | fluid milk per capita sales | own expenditures July 1976-June 1977, monthly | polynominal 5 lag | seasonality, real income, price of cola, price of whole milk | single equation demand | OLS | significant, as expected |
| Thompson and Eiler (1977) | fluid milk per capita sales | own expenditure Jan 1971-March 1974, monthly | 5 periods | seasonality, income, retail price of whole milk | polynomial distributed lag single equation demand | OLS | significant, as expected |
| Venkateswaran and Kinnucan (1990) | fluid milk consumption (Q) | own expenditures 1973-1984, quarterly | | price milk, price of orange juice, expenditure on milk, disposal income, age, seasonality | 4 functional forms compared; double log, semilog, log inverse, inverse single equation demand | OLS | significant, as expected |
| Venkateswaran, Kinnucan and Chang (1993) | fluid milk sales per capita | own expenditures 1971-1988 monthly | explicit 7 period lag Shiller | price of milk, cola, coffee, income, time, seasonality | log-log single demand equation | OLS, Almon, Shiller | significant (t to t-6), as expected |

| Author | Dependent Variable | Advertising | Lags | Other Variables | Model & Form | Technique | Advertising Elasticity |
|---|---|---|---|---|---|---|---|
| Ward and Dixon (1989) | fluid milk consumption (Q) | own expenditure 1984-1987, monthly | 12 month weighted polynomial lag advertising variable with goodwill | income, price, price of orange juice, trend, season, population under 18, female population, black population, rural population, one person families, schooling | double log, pooled cross-sectional time-series single equation demand | OLS | significant, as expected |
| Kaiser and Forker (1993) | dairy quantity demand | own expenditures 1975-1990, quarterly | 1-3 quarters | price, price of substitutes, income, seasonality, trend | double logarithm demand system | | significant, as expected |
| Kaiser, Liu, Mount, Forker (1992) | dairy supply of raw milk | own expenditure 1980-1987, quarterly | | own price, price at other market levels, income, trend | 3 sector model | SSS procedure | mixed |
| Chang and Green (1992) | various farm products expenditures (Q*P) | own expenditures 1980-1984, quarterly | various lags | price, demographics, income | linear LA/AIDS | SUR | not significant |
| Chang and Kinnucan (1990) | butter, margarine, shortening, salad oil per capita sales(Q) | own expenditure, advertising price interaction 1973-1986, quarterly | explicit 8 period lag on butter, none other products | seasonality, price of goods, total expenditures on fats and oils, dummy for DBC intervention | semi-logarithmic single equation demand | SUR | butter significant, as expected; other goods insignificant |
| Chang and Kinnucan (1991) | butter per capita consumption (Q) | goodwill variable, total media expenditure weighted by the ratio of own advertising to total advertising. 1973-1966, quarterly | advertising expenditure lagged 3 quarters equivalent to nine months in model | real price of good (whose own price coefficient is a function of advertising), consumer's total group expenditure on fats and oils deflated by Stone price index, consumer information on cholesterol, seasonal dummy | semi-logarithmic two stage conditional demand | SUR | as expected and significant |
| Pitts (1979) | butter and margarine volume of sales (Q) | expenditure 1972-1977, bimonthly | | price, seasonality | various forms single equation demand | OLS | mixed |
| Chang and Kinnucan (1992) | fats and oils quantity consumed | own advertising 1973-1986, quarterly | varied | own price, population | LA/AIDS single equation | SUR | not significant |

| Author | Dependent Variable | Advertising | Lags | Other Variables | Model & Form | Technique | Advertising Elasticity |
|---|---|---|---|---|---|---|---|
| Cox (1992) | fats and oils budget shares (sales) | advertising stock expenditures 1978-1986, quarterly | 2-3 month, butter, 4-6 shortening, 4-6 salad oil, 1 quarter margarine | prices | Rotterdam single equation demand | SUR | mixed |
| Goddard and Amuah (1989) | individual and aggregate demand for fats and oils expenditures (P*Q) | expenditures 1973-1986, quarterly | consumption lagged one period, advertising lagged one period | prices, disposable income, seasonality, habit formation, time | log-linear expenditure for aggregate demand, translog expenditure share system for individual demands 2 stage demand | OLS estimator for aggregate demand, iterative SUR estimation for individual demands | insignificant for aggregate demand, significant for individual commodities |
| Jones and Choi (1992) | fresh and processed potato sales | own expenditure 1970-1987, annual | | own price, women working, income, price of rice, price of cookie, unemployment, trend | double logarithmic inverse form single demand equation | | significant, as expected |
| Jones and Ward (1989) | potato consumption | expenditures 1970-85, annual | | price retail and wholesale, farm income, fast food expenditures, women labour, unemployment, substitutes | multi equation demand system | 3-stage least squares | insignificant for generic potatoes check |
| Green, Carman, McManus (1991) | California dried fruit per capita consumption (Q) | expenditures 1957-1986, annual | lagged advertising | prices, total capital expenditures | double-log single demand equation and a demand system (AIDS) | SUR | significant for current period double-log model, insignificant for AIDS model |
| Lee (1981) | grapefruit retail demand (Q) | advertising expenditure index 1971-1978, quarterly | ad 3 periods | income, population, price of grapefruit juice, price of substitutes | multi-equation reduced form simultaneous equation | 2 stage least squares | significant, as expected |
| Carmen and Green (1993) | avocado price | generic expenditure 1961-1990, annual | no lags | sales of avocados, income | Box-Cox | non-linear | significant, as expected |

| Author | Dependent Variable | Advertising | Lags | Other Variables | Model & Form | Technique | Advertising Elasticity |
|---|---|---|---|---|---|---|---|
| Lee and Brown (1986) | orange juice per capita demand (Q) | expenditure | | exchange rate, price of good, income, expenditures | single equation demand | OLS | significant, as expected |
| Powers (1989) | orange juice quantity (Q) disaappearance | ad index 1982-1985, weekly | lagged ad index one week | fob price of oranges, apple price, disposable income, christmas dummy, seasonality | inverse and semilog single equation demand | 2 stage least squares | significant, as expected |
| Chyc and Goddard (1994) | egg expenditure | generic expenditure 1974-1989 annual | lagged dependent variable | quantity, time income | double log | OLS | significant, as expected |
| McCutcheon and Goddard (1991) | egg expenditure per capita | own expenditures 1978-1989, quarterly | 2 quarter lag | quantity, income | logarithmic demand and linear demand demand system | OLS | significant, as expected |
| Strak and Ness (1978) | egg sales | expenditures 1972-1976, monthly | advertising (free form) | disposable income, price, price of substitute and commplements | double log single equation demand | | mixed |

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