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Commodity Promotion Economics: A Symposium in Honor of Olan Forker's Retirement

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Commodity Promotion Economics: A Symposium in Honor of Olan Forker's Retirement

Preface by Harry M. Kaiser[1]

On December 31, 1995, Olan Forker officially retired from Cornell University after a long and distinguished tenure in the agricultural economics profession. To celebrate his retirement, a symposium dealing with commodity promotion was held on February 2, 1996 at Cornell University. Over 50 individuals from academia, government, and industry attended this one day symposium. The following is a proceedings of all the presentations given.

Olan is one of the founding fathers of research aimed at examining the economic impacts commodity promotion has on markets. His work in this area is well-known and well-respected by his peers in the agricultural economics field. Also, leaders of commodity promotion groups have come to rely on Olan. He is one of those rare individuals who has made significant contributions in applied research of interest to both the industry and academics.

I think it is only fitting to hold a symposium to honor Olan, who has been a pioneer in the commodity promotion economics area. While most people know Olan from his work in commodity promotion economics, not many know that he as also been a leader in several other areas as well. In addition to being a professor in the department of Agricultural Economics at Cornell, Olan also served as chair of the department and chair of the undergraduate program. He also served as a faculty trustee at Cornell University, a prestigious position conferred upon only two faculty members from Cornell at a time. Olan was instrumental in getting funding from the Mellon Foundation and running an M.S. program in Nitra, Slovakia for students from Eastern and Central Europe. This program currently trains about 25 M.S. students each year, and some of them have gone on to complete Ph.D. programs in the United States. He has also been a leader in the

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agricultural economics profession, serving as president of the Northeastern Agricultural and Resource Economics Association and director of the American Agricultural Economics Foundation. Olan is widely respected and appreciated by his colleagues for all of the service he has volunteered over the years.

This book features the papers and letters presented to Olan on this occasion and includes the pieces by Henry Kinnucan, Donald Liu, Ron Ward, Stan Thompson, Skip Hardie, and Olan himself. On behalf of my colleagues at NICPRE, I extend to Olan our best wishes in his retirement. I will also be somewhat selfish and call often upon his expertise in the future to help continue the excellence in commodity promotion economics that Olan helped create.

Welfare Implications of Generic Advertising with Variable Proportions: U.S. Meats[1]

Henry W. Kinnucan[2]

Introduction

Generic advertising of agricultural products by farm groups has increased significantly over the past 15 years. In the United States, farmers in 1989 invested some $751 million in programs designed to stimulate the demand for their products in domestic and foreign markets (Forker and Ward, 1993, p. 101), compared to about $230 million in 1982 (Armbruster and Frank, 1988, p. 4). Federal subsidies for nonprice promotion of agricultural-based products in export markets grew from $20 million in 1982 to $233 million in 1992 before declining to the current level of $105 million (Kinnucan and Ackerman, 1995, p. 123).

The rapid growth in expenditures, coupled with the fact that the programs are increasingly being funded through mandatory assessments, has heightened interest in benefit-cost analysis. Producers want to know whether promotion pays, policy makers worry about the distributional consequences of generic advertising programs, and the courts question whether generic advertising is sufficiently effective to warrant compulsory "takings" of producer monies. Although the issues have been addressed in the empirical literature (e.g., Ward and Dixon, 1989; Liu, Kaiser, Forker and Mount, 1990; Zidack, Kinnucan and Hatch, 1992; Ward and Lambert, 1993; Kaiser, Forker, Lenz, and Sun, 1993; Kinnucan and Belleza, 1995; Kinnucan, Xiao, and Hsia, 1996), theoretical questions remain about the determinants of generic advertising effectiveness.

This article focuses on the relationship between generic advertising rents (producer surplus) and processing/marketing technology. Processing/marketing technology is of interest because it constrains middlemen in their responses to advertising-induced changes in relative prices.

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[1]Paper presented at the Cornell University seminar, "Commodity Promotion Economics," on February 2, 1996, in honor of Dr. Olan D. Forker's retirement and submitted for publication to the ***European Review of Agricultural Economics***, January 25, 1996.

[2]The author is a professor of agricultural economics at Auburn University, Auburn, Alabama. Appreciation is expressed to Hui Xiao for checking the math and to Robert Nelson for reading an earlier version of the manuscript. Financial support for this research was provided in part by the National Institute for Commodity Promotion Research and Evaluation (NICPRE). Responsibility for final content rests strictly with the author.

Middlemen responses determine the extent to which advertising-induced shifts in retail demand are translated into benefits at the farm level. Two basic types of processing/marketing technologies are considered: fixed proportions and variable proportions. With fixed proportions technology, the assumption is that food processing or marketing firms have no scope for substituting marketing inputs for the agricultural input as the relative price of the agricultural input rises in response to increased advertising. Wohlgenant's (1989) work suggests that this is an invalid assumption. Accordingly, the assumption of variable proportions technology permits substitution between marketing and agricultural inputs.

Relaxing the assumption of fixed proportions is important because theory indicates an inverse relationship between advertising rents and the absolute value of the market demand elasticity (Dorfman and Steiner, 1954; Nerlove and Waugh, 1961; Alston, Carman, and Chalfant, 1994). Disallowing input substitution causes derived-demand elasticities for farm output to be understated (Wohlgenant, 1989), which implies that profits from generic advertising will be overstated. Thus, benefit-costs analyses that assume fixed proportions are liable to portray generic advertising in a more favorable light than is warranted by the underlying economic relationships.

The objective of this research is to determine the effect of processing/marketing technology on the farm-gate profitability of generic advertising programs. The U.S. beef and pork programs serve as the focus of analysis because they represent the third and fourth largest programs, respectively, in the United States after dairy and citrus (Forker and Ward, 1993, p. 102). In addition, sufficient econometric work has been completed on meat advertising (Brester and Schroeder, 1995; Kinnucan, Xiao, and Hsia, 1996) to parameterize the economic model. Owing to the interrelatedness of consumer preferences for meats, the distributional consequences of generic advertising (Piggott, Piggott, and Wright, 1995; Kinnucan, Xiao, and Hsia, 1996) are particularly germane.

The analysis is based on a Muth-type (1965) equilibrium-displacement model. The model is first developed for an isolated market in which the advertised good is assumed to be strictly separable from all other goods. The model is then generalized to incorporate demand interrelationships. A key insight from the analysis is that a critical parameter governing advertising rents is the farm-retail price transmission elasticity.

Basic Model

The basic model consists of an isolated vertical market with competitive market clearing. Advertising is assumed to occur in the retail market and returns are to be measured in the farm market. Following Nerlove and Waugh (1961), advertising is treated as an exogenous lump-sum expenditure. Advertising costs, therefore, are considered separately from benefits. The basic model is:

(1) $d\ln Q = -N\, d\ln P_r + B\, d\ln A$ (retail demand)

(2) $d\ln X = E\, d\ln P_f$ (farm supply)

(3) $d\ln P_r = T\, d\ln P_f$ (farm-retail price linkage)

(4a) $d\ln Q = d\ln X$ (Leontief market clearing)

or

(4b) $d\ln Q = d\ln X + d\ln P_f - d\ln P_r$ (C-D market clearing)

where $d\ln Y = dY/Y$ is the relative change in variable Y; Q is quantity demanded at retail; X is the quantity supplied at the farm level; P_r is retail price; P_f is farm price; A is advertising expenditures; N is the absolute value of the retail level demand elasticity; B is the advertising elasticity; E is the farm level supply elasticity; and T is the farm-retail price-transmission elasticity. The model consists of four endogenous variables, Q, P_r, X, P_f, and one exogenous variable, A. Given the negative sign in (1), N, E, T, and B are assumed to be positive.

The price-linkage equation (equation (3)) may be thought of as a quasi-reduced form that reflects the behavior of middlemen (Hildreth and Jarrett, 1955). That the equation depicts accurately the relationship between retail and farm price rests on the assumption that forces causing the two prices to change (e.g., shifts in retail demand or farm supply) exert their influences separately rather than in combination (Gardner, 1975, p. 404). If this is not the case, a more complicated form of the price-transmission equation may need to be specified (Wohlgenant and Mullen, 1987).

The equilibrium mechanism in the model (equations (4a) and (4b)), derived in the appendix, indicates market clearing under two alternative marketing technologies. One technology is fixed proportions (Leontief). In this case, relative changes in equilibrium quantities at farm and retail are identical and equation (4a) applies. An alternative assumption is the Cobb-Douglas (C-D) form of a variable-proportions technology. In this case, relative changes in equilibrium quantities at the two market levels in general are not equal, and (4b) applies. Both technologies are consistent with an aggregate technology for food processing and marketing that exhibits constant returns to scale, an hypothesis that is valid for U.S. food systems (Wohlgenant, 1989, p. 251). Empirical estimates of the substitution elasticities for major food groups range from zero to approximately one (Wohlgenant 1989, p. 250), so the technologies represent an appropriate range of substitution possibilities.

The first task is to determine the effect of marketing technology on advertising's ability to raise farm price. This entails comparing the reduced-form equations for farm price under the two technologies. The reduced form under Leontief technology is derived by substituting equations (1) - (3) into (4a) and solving for $d\ln P_f$:

$$\text{(5a)} \quad d\ln P_f = [B/(E + T\,N)]\, d\ln A.$$

Equation (5a) yields the hypothesis that an increase in advertising, under the stated conditions, always increases farm price if marketing technology is Leontief. The equation indicates that advertising's price enhancement ability is directly related to the advertising elasticity and inversely related to the supply, demand, and price-transmission elasticities. This result is consistent with the Dorfman and Steiner (1954) theorem and with Nerlove and Waugh's (1961) analysis, provided that the composite term $T\,N$ in (5a) is interpreted as the *farm level* demand elasticity, a valid interpretation under fixed proportions (Gardner, 1975, p. 404).

The reduced-form equation for farm price under C-D technology is obtained by substituting equations (1) - (3) into (4b), which yields:

$$\text{(5b)} \quad d\ln P_f = \{B/[E + T\,N + (1 - T)]\}\, d\ln A.$$

Comparing (5a) and (5b), it is evident that marketing technology has an important bearing on the ability of advertising to raise farm price. In particular, relaxing the assumption of fixed proportions weakens advertising's price effect. The price effect, in fact, is indeterminate without information on the magnitudes of the supply, demand, and price-transmission elasticities.

The conditions necessary for advertising to raise farm price under variable proportions can be determined by focusing on the denominator of (5b). Simple inspection yields the hypothesis that $d\ln P_f/d\ln A > 0$ so long as $0 < T \leq 1$. The empirical literature suggests that this condition is met for most food items. George and King (1971, p. 62), for example, report transmission elasticities for 32 commodities, only seven of which exceed unity. Six of these (shortening, evaporated milk, sugar, canned corn, canned tomatoes, and corn meal) are for products that tend not to be promoted by farm groups. The estimated transmission elasticity for the remaining product, cheese, which is heavily promoted, is 2.74 (George and King, 1971, p. 62). More recent estimates, however, place the cheese transmission elasticity at 0.58 or less (Kinnucan and Forker, 1987, p. 289).

Algebraic manipulation of (5b) yields two additional conditions that will assure a positive price effect under variable proportions. One condition is that $N \geq 1$. This condition in general is not satisfied in that most empirical studies indicate that food demands are price inelastic at retail (e.g, Huang, 1985). However, farm groups promote a large number of specialty products (e.g., citrus, raisins, prunes, wine, almonds, peaches, grapes, catfish -- see Forker and Ward (1993, pp. 102-03) for a complete listing) whose retail demands may well be elastic. For these commodities, theory predicts a positive relationship between advertising and farm price -- whether or not input substitution occurs.

The second condition derived from algebraic manipulation of (5b) pertains to the situation where $T > 1$ and retail demand is inelastic. In this case, (5b) is positive provided that $T < (1 + E)/(1 - N)$. This condition implies, for example, that if $E = N = 0.5$, $\mathrm{dln}P_f/\mathrm{dln}A > 0$ so long as $T < 3.0$. With the exception of canned corn, George and King's (1971) estimates of T are all less than 3.0. Thus, even if $T > 1$ and retail demand is inelastic, it would take an unusually large transmission elasticity to cause advertising's price effect in (5b) to turn negative.

Owing to the importance of the price-transmission elasticity in determining the direction and magnitude of advertising's price effect, interest centers on its determinants. Gardner (1975, p. 403, equation (18)) derives the following theoretical expression for T that is valid in situations involving isolated shifts in retail demand, the relevant case for advertising:

$$(6) \qquad T = (\sigma + S_x e_m + S_m E) / (\sigma + e_m).$$

In this expression, σ is the elasticity of substitution between the farm-based input and the bundle of marketing inputs; S_x and S_m are cost shares for the farm-based and marketing inputs, respectively; e_m is the marketing inputs' supply elasticity; and E is the previously defined supply elasticity for the agricultural input.

Equation (6) is a general expression for the transmission elasticity under conditions of competitive market clearing and constant returns to scale (CRTS). It can be specialized to the present analysis by setting $\sigma = 0$ (Leontief technology) or $\sigma = 1$ (C-D technology) as noted in Table 1.

Table 1. Elasticity of Farm-Retail Price Transmission: Theoretical Values and Implied Restrictions for Isolated Shifts in Retail Demand

THEORETICAL VALUE	RESTRICTION
$T = (\sigma + S_x e_m + S_m E) / (\sigma + e_m)$	CRTS marketing technology
$T = (S_x e_m + S_m E) / e_m$	Leontief marketing technology
$T = (1 + S_x e_m + S_m E) / (1 + e_m)$	Cobb-Douglas marketing technology
$T = 1$	$E = e_m$, constant percentage markup
$T < 1$	$E < e_m$
$T = S_x$	$e_m \rightarrow \infty$, constant absolute markup

The first question of interest is under what conditions the transmission elasticity exceeds unity. From equation (6), $T > 1$ obtains only if $E > e_m$, i.e., the supply elasticity of the agricultural product exceeds the supply elasticity of marketing inputs. Because agricultural product supply tends to be price inelastic, and the marketing inputs' supply schedule is commonly assumed to be horizontal (e.g., Holloway, 1991; Wohlgenant, 1993), this condition would not ordinarily obtain, a result verified by George and King's (1971) empirical estimates. Thus, the theoretical relationship between farm price and advertising expressed in equation (5b) is positive, so long as agricultural supply is relatively price inelastic.

Two other cases of interest are $T = 1$ and $T = S_x$. The former obtains when $E = e_m$. This case is of interest because it suggests that retail-level demand elasticities can be used to measure farm-level returns (e.g., Piggott, Piggott, and Wright, 1995) only in the special case that the supply elasticities for the agricultural and marketing inputs are equal. This is a stringent condition.

The second case, $T = S_x$, obtains when the marketing inputs' supply curve is horizontal. Employing this assumption, for example, Wohlgenant (1993, p. 645) derives the following reduced form (in my notation) in his analysis of advertising based on duality concepts:

(5c) $\text{dln}P_f = [B/(E + S_x N + (1 - S_x)\,\sigma]\ \text{dln}A$

Comparing equations (5a), (5b) and (5c), it is evident that the equations are consistent. In particular, equation (5c) reduces to (5b) if $\sigma = 1$ and to (5a) if $\sigma = 0$ and the supply schedule for marketing services is non-horizontal. This illustrates a key advantage of the model developed in this study: it provides a flexible method of representing the range of input substitution relationships that appear to be relevant to the food system without requiring the supply schedule for marketing inputs to be horizontal.

Incorporating Demand Interrelationships

Demand interrelationships can be incorporated into the analysis with some rather straightforward matrix algebra. For this purpose, rewrite the structural model (deleting the Leontief market clearing condition, as this drops out as a special case of C-D market clearing) as:

(7) $\mathbf{I}\ \text{dln}\mathbf{Q} = \mathbf{N}\ \text{dln}\mathbf{P} + \mathbf{B}\ \text{dln}\mathbf{A}$

(8) $\mathbf{I}\ \text{dln}\mathbf{P} = \mathbf{T}\ \text{dln}\mathbf{W}$

(9) $\mathbf{I}\ \text{dln}\mathbf{X} = \mathbf{E}\ \text{dln}\mathbf{W}$

(10) $\mathbf{I}\ \text{dln}\mathbf{Q} = \mathbf{I}\ \text{dln}\mathbf{X} + \mathbf{I}\ \text{dln}\mathbf{W} - \mathbf{I}\ \text{dln}\mathbf{P}$

where **I** is an identity matrix; **N** is a square matrix of retail-level demand elasticities; **B** is a square matrix of advertising elasticities; **T** is a square matrix with price-transmission elasticities along the main diagonal and zeroes elsewhere; **E** is a square matrix with farm-level supply elasticities along the main diagonal and zeroes elsewhere[3]; dln**Q** is a vector of retail quantity changes; dln**P** is a vector of retail price changes; dln**X** is a vector of farm-level quantity changes; dln**W** is a vector of farm-level price changes; and dln**A** is a vector of advertising changes. Letting n denote the number of commodities in the system, all matrices are $n \times n$ and all vectors are $n \times 1$.

[3]If competition for common resources at the farm level is deemed important (e.g., between lamb and beef production in Australia, see Piggott, Piggott, and Wright 1995), the off-diagonal elements of the **E** matrix would be non-zero to reflect cross-price elasticities of supply.

The reduced form equation for farm price is obtained by substituting equations (7) - (9) into (10) and collecting terms, which yields:

$$\mathbf{C}\, \mathrm{dln}\mathbf{W} = \mathbf{B}\, \mathrm{dln}\mathbf{A}$$

where

(11) $\mathbf{C} = (\mathbf{E} - \mathbf{T}\,\mathbf{N} + (\mathbf{I} - \mathbf{T})\,\sigma)$.

The σ term in (11) is a scalar to indicate whether marketing technology is Leontief or C-D. In particular, for C-D marketing technology, $\sigma = 1$; for Leontief technology $\sigma = 0$. In the latter case, the $(\mathbf{I} - \mathbf{T})$ term in $\mathbf{C}$ disappears, as it must to indicate Leontief technology (compare (5a) and (5b)). Premultiplying the above expression by $\mathbf{C}^{-1}$ gives the reduced form for farm price:

(12) $\mathrm{dln}\mathbf{W} = \mathbf{C}^{-1}\,\mathbf{B}\,\mathrm{dln}\mathbf{A}$

Equation (12) can be made more intelligible by considering the case in which $n = 2$, and only the first good is advertised. In this case, the own-price effect is:

(13) $\mathrm{dln}W_1 = \{(B_{11}\,(E_2 + L_{22}) + B_{21}\,T_2\,N_{12})/((E_1 + L_{11})(E_2 + L_{22}) - T_2\,N_{12}\,T_1\,N_{21})\}\,\mathrm{dln}A_1$

where i indexes the good, Q_i and P_i refer to retail quantities and prices; X and W refer to farm quantities and prices; and A_1 is advertising for good 1. The parameters E_1 and E_2 are farm-level supply elasticities; N_{12} and N_{21} are cross-price elasticities; B_{11} is the own-advertising elasticity; and B_{21} is the cross-advertising elasticity. The L_{ii} term in (12) is $L_{ii} = T_i\,N_{ii} + (1 - T_i)\,\sigma$, where N_{ii} is the absolute value of the retail-level own-price elasticity for good i, and σ is the previously defined scalar.

Equation (13) highlights the complexity that demand interrelationships bring to the analysis. Even in a relatively simple case with two goods, it is impossible to predict how advertising affects farm price without some simplifying assumptions. One plausible assumption is that cross-price elasticities are small compared in own-price elasticities (e.g., Kinnucan, 1996). In this case, and assuming that the cross-advertising elasticity is smaller in absolute value than the own-advertising elasticity, the numerator and denominator of (13) will tend to be positive, yielding the hypothesis that own-advertising increases own-price at the farm level.

Application

A key finding from the foregoing analysis is that variable proportions dampens the own-price effect of generic advertising. The empirical implications of this finding are now examined using equations (7) - (12) and the parameters and baseline data for the three-sector U.S. meat industry given in Table 2. To assess the bias associated with misspecification of marketing technology, the price impacts of isolated 10 percent increases in beef and pork advertising were simulated by setting σ in equation (12) alternatively to zero (Leontief scenario) and one (C-D scenario). (Poultry advertising is not simulated because poultry advertising is strictly *brand*-based and funded voluntarily by individual firms; at issue in this analysis is the impacts of *generic* advertising funded collectively by farmers on a *compulsory* basis.) The quantity impacts were then obtained through back substitution of equation (12) into equation (9).

With price and quantity effects in hand, the farm-gate impacts under each technology were then measured using the equation

(14) $\Delta Ps_i = S_x^i P_i Q_i \,\mathrm{dln}W_i (1.0 + 0.5\,\mathrm{dln}X_i)$

where ΔPS_i is the change in producer surplus in the ith meat sector associated with an isolated 10 percent increases in beef and pork advertising, and S_x^i, P_i, and Q_i are as defined in Table 2. Equation (14) implicitly assumes that advertising generates parallel shifts in linear demand schedules, an assumption deemed innocuous if equilibrium displacements are small (Alston, Norton, and Pardey, 1995, pp. 48-50), as they are in this study.

Empirical estimates of the supply elasticity for marketing services are unavailable. Wohlgenant (1993) set the elasticity to infinity; Gardner (1975) seemed to prefer a value of two. Both values are used in the simulations to gauge the sensitivity of results to this parameter. Numerical values for the transmission elasticities under each scenario were calculated from the appropriate equations given in Table 1 and the parameter values for S_x^i, e_m, and E in Table 2 (note: $S_m^i = 1 - S_x^i$).

Two alternative sets of demand and advertising elasticities are used in the simulations. The first set is from Brester and Schroeder (B&S) (1995) based on data through 1993.IV; the second set is from Kinnucan, Xiao, and Hsia (1996) (KX&H) utilizing data through 1991.III. The advertising elasticities for beef and pork pertain to generic, not brand, advertising. Advertising elasticities with t-ratios less than one in absolute value were set to zero. To gauge the sensitivity of results to supply response, the simulations based on B&S estimates are repeated with the supply elasticities in Table 2 doubled.

Table 2. Parameter and Baseline Values for U.S. Beef, Pork, and Poultry Industries 1990

Parameter/ Variable	Definition	VALUE		
		Beef	Pork	Poultry
N_{1j}	Price elasticity w.r.t. beef demand[a]	-0.56 (-0.42)	0.10 (0.29)	0.05 (0.10)
N_{2j}	Price elasticity w.r.t. pork demand[a]	0.23 (0.61)	-0.69 (-0.65)	0.04 (-0.06)
N_{3j}	Price elasticity w.r.t. poultry demand[a]	0.21 (0.33)	0.07 (-0.10)	-0.33 (-0.17)
B_{1j}	Advertising elasticity w.r.t. beef demand[a b]	0.006 (0.0013)	0.002 (0.0006)	0.017 (na)
B_{2j}	Advertising elasticity w.r.t. pork demand[a b]	-0.009 (0.0017)	0.0 (0.0)	0.0 (na)
B_{3j}	Advertising elasticity w.r.t. poultry demand[a]	-0.011 (-0.0059)	-0.010 (-0.0006)	0.047 (na)
E_i	Farm-level supply elasticity[c]	0.15	0.40	0.31
S_x^i	Farmers' share of retail dollar[c]	0.60	0.41	0.51
e_m	Elasticity of supply of marketing services[d]	2, ∞	2, ∞	2, ∞
T_i	Elasticity of retail-farm price transmission[e]	--	--	--
A_i	Advertising expenditures (mil $)[f]	35.0 (1.0)	9.0 (50.0)	-- (52.0)
P_i	Retail price ($/lb)[c]	2.81	2.13	0.90
Q_i	Retail quantity (lbs/capita)[c]	67.0	51.1	83.4
$P_i Q_i$	Total consumer expenditures (bil. dol.)[g]	46.5	26.9	18.5

Sources:

[a] Top number is Brester and Schroeder's (1995, p. 977) estimate; number in parentheses is Kinnucan, Xiao and Hsia's estimate (1996).

[b] Beef and pork elasticities from B&S are for *generic* advertising. KX&H did not estimate an advertising elasticity for poultry. Non-significant (*t*-ratio less than one) elasticities are set to zero.

[c] Sources are given in Kinnucan, Xiao, and Hsia (1996).

[d] Assumed values.

[e] To be computed from equations given in Table 1.

[f] Top number is generic expenditures, number in parentheses is brand. Data refer to 1990 expenditures based on Brester and Schroeder's Figure 1 (1995, p. 972).

[g] Based on a U.S. 1990 population of 246.9 million.

Results confirm the direction of the biases suggested by theory. That is, when technology is fixed proportions, the advertising effects are more pronounced than when technology is variable proportions (Table 3). Results are relatively insensitive to supply response, but quite sensitive to demand and advertising elasticities. In general, the simulations based on the B&S demand estimates produce larger welfare impacts than the simulations based on the KX&H estimates. However, the overall pattern of welfare effects being overstated under fixed proportions is preserved. The slope of the marketing services' supply schedule has only a modest effect on advertising rents.

Bearing in mind that a 10 percent increase in beef advertising represents an incremental expenditure of $3.5 million, a general conclusion to be drawn from Table 3 is that the beef program is highly effective from the perspective of the beef industry. That is, incremental returns to the beef sector exceed incremental expenditures in all the simulations by a substantial margin. The pork program, however, is ineffective, at least from the standpoint of the pork industry. The incremental returns to increased pork advertising are not sufficient to cover the incremental cost of $0.9 million, unless technology is fixed proportions and the KX&H elasticities apply. In the latter case, returns are just sufficient to cover expenditures, so the program is at best a break-even proposition[4]

A second conclusion to be drawn from Table 3 is that generic advertising has distributional consequences. The beef and pork programs, for example, each generate negative externalities for the poultry sector. The external losses associated with increased beef advertising are large enough in some instances to negate the internal gains, resulting in a net welfare loss. Pork advertising confers positive externalities on the beef sector, which reinforces the internal gains experienced by the beef sector from its own advertising. Thus, the clear winner in the meat advertising game is the beef sector.

A third conclusion from Table 3 is that meat advertising may be a zero-sum game, as some have contended (e.g., Hayes and Jensen, 1993). That is, welfare gains to the beef sector tend to be offset by losses in the pork or poultry sectors, resulting in only modest gains, or, in some cases, a loss, for meat producers as a group. Taking simulation 2 in Table 3 as the "best guess" scenario, a simultaneous increase in beef and pork advertising would result in a net welfare loss for the U.S. meat industry as a whole.

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[4]This statement requires qualification. In particular, producers in competitive markets in general are not expected to bear the full incidence of the advertising levy unless supply is perfectly inelastic. The equation for producers' incidence is $I_f = 1/(1 + E/(S_x N))$ (Chang and Kinnucan, 1991, p. 170). For pork, $E = 0.40$, $S_x = 0.41$, and $N = 0.65$ (Table 2), so $I_f = 0.40$. Thus, pork producers in reality may pay only 40 percent of the $0.9 million increment, or $0.36 million. In this case, simulation 3 in Table 3 would indicate a positive return to pork advertising, provided the marketing services' supply schedule is not perfectly elastic.

Table 3. **Producer Welfare Impacts of Isolated 10 Percent Increases in Beef and Pork Advertising Under Fixed Proportions ($\sigma_i = 0$) and Variable Proportions ($\sigma_i = 1$) for Alternative Values of the Supply Elasticity for Marketing Services (e_m), Farm- Level Supply Elasticities, and Retail-Level Demand and Advertising Elasticities United States, 1990**

ITEM	10% ↑ IN BEEF ADVERTISING				10% ↑ IN PORK ADVERTISING			
	$\sigma_1 = \sigma_2 = \sigma_3 = 0$		$\sigma_1 = \sigma_2 = \sigma_3 = 1$		$\sigma_1 = \sigma_2 = \sigma_3 = 0$		$\sigma_1 = \sigma_2 = \sigma_3 = 1$	
	$e_m = 2$	$e_m = \infty$	$e_m = 2$	$e_m = \infty$	$e_m = 2.0$	$e_m = \infty$	$e_m = 2.0$	$e_m = \infty$
Simulation 1:	-- million dollars --				-- million dollars --			
Beef	26.9	28.6	17.3	17.2	8.0	8.5	5.4	5.5
Pork	- 11.6	- 12.9	- 7.7	- 7.2	- 0.05	0.02	- 0.01	0.06
Poultry	- 19.0	- 19.8	- 11.8	- 10.1	- 18.0	- 19.0	- 11.1	- 9.5
All	- 3.7	- 4.1	- 2.3	- 0.2	- 10.1	- 10.4	- 5.7	- 3.9
Simulation 2:								
Beef	21.6	23.5	15.2	15.0	6.8	7.4	4.8	4.9
Pork	- 7.2	- 8.2	- 5.9	- 5.6	0.06	0.12	0.02	0.06
Poultry	- 11.5	- 12.1	- 8.9	- 7.7	- 10.9	- 11.6	- 8.3	- 7.2
All	2.8	3.1	0.4	1.8	- 4.1	- 4.0	- 3.5	- 2.3
Simulation 3:								
Beef	7.7	7.8	4.6	4.1	4.4	4.4	2.3	2.0
Pork	4.8	5.2	2.6	2.1	0.9	1.0	0.4	0.2
Poultry	- 12.8	- 13.2	- 7.5	- 6.1	- 0.7	- 0.7	- 0.5	- 0.5
All	- 0.3	- 0.2	- 0.3	0.1	4.7	4.7	2.2	1.7

Note: Simulation 1 uses Brester and Schroeder's (1995) demand and advertising elasticities and the supply elasticities in Table 2. Simulation 2 replaces simulation 1's supply elasticities with twice the value of Table 2's supply elasticities. Simulation 3 uses Table 2's supply elasticities and Kinnucan, Xiao and Hsia's (1996) demand and advertising elasticities. Totals may not sum due to rounding.

Concluding Comments

The basic theme of this paper is that middlemen behavior is important in determining the economic impacts of generic advertising programs. The analysis builds on Nerlove and Waugh's (1961) theory of generic advertising by extending their model to distinguish between retail markets, where advertising occurs, and farm-level markets, where returns are measured. A key finding is that returns to generic advertising tend to be overstated if input substitution by food processing and marketing firms is disallowed.

In addition to vertical market relationships, the economic impacts of generic advertising programs are governed by horizontal relationships. Retail markets are interrelated through consumer preferences, and farm-level markets are interrelated through competition for common resources. A further complication is that producers in competitive markets tend to respond to advertising-induced increases in price by expanding output. The enlarged quantity, when it reaches the market, undermines advertising effectiveness by dampening the own-price response. The equilibrium-displacement model developed in this paper provides an efficient method for sorting out these impacts. When applied to the U.S. meat industry, results suggest that supply response is less of an issue than cross-commodity substitution and processing/marketing technology. That is, benefit-cost ratios are more affected by input substitution by middlemen and commodity substitution by consumers than by supply response by producers.

The simulation results showing gains to beef producers coming largely at the expense of poultry producers highlight the distributional consequences of generic advertising. The external effects of generic advertising are no less important than the internal effects, an issue that deserves greater attention in the benefit-cost literature. The model and procedures developed in this paper provide a useful framework for taking into account the many complexities of generic advertising evaluation.

APPENDIX
Derivation of Market-Clearing Conditions Under Variable Proportions
(Cobb-Douglas Technology)

First, define initial equilibrium as:

(A.1) $Q_d = k X_s$

where Q_d is the quantity demanded at retail; X_s is the quantity supplied at the farm level; and k is the number of units of retail product per unit of the farm product, i.e., $k = Q_s / X_d$, where Q_s is the quantity supplied at retail, and X_d is the quantity demanded at farm. k hereafter is referred to as the "dressing percentage."

Recognizing that in competitive equilibrium $Q_d = Q_s = Q$ and $X_s = X_d = X$, the logarithmic total differential of (A.1) yields:

(A.2) $d\ln Q = d\ln X + d\ln k$

where $k = Q/X$ (average product). Equation (A.2) indicates that the relationship between changes in equilibrium quantities at two market levels depends on the behavior of the dressing percentage. Two special cases of interest in this paper are (i) the dressing percentage is a constant and (ii) the dressing percentage varies, but in a manner consistent with a Cobb-Douglas processing/marketing technology. A constant dressing percentage implies that $d\ln(Q/X) = 0$, which is consistent with a Leontief processing/marketing technology (Chambers 1988, p.16). In this case, (A.2) reduces to:

(A.3) $d\ln Q = d\ln X$ (Leontief market-clearing)

To derive the market clearing condition under a Cobb-Douglas marketing technology, consider the production function:

(A.4) $Q = X^c M^{(1-c)}$

where M is a bundle of marketing inputs and $0 < c \leq 1$. The implications of (A.4) for the behavior of the dressing percentage is determined by solving the production elasticity c $(= (\partial Q / \partial X)/k)$ for k, which yields $k = (\partial Q/ \partial X)/c$. Under the maintained hypothesis of competitive markets, inputs are paid the value of their marginal products. Thus, $k = (P_f / P_r)(1/c)$. The total derivative of this expression is:

$$dk = d(P_f / P_r)(1/c) + d(1/c)(P_f / P_r)$$

Setting $d(1/c) = 0$ (the production elasticity is constant), and dividing both sides of the above expression by k yields:

(A.5) $dk/k = [d(P_f / P_r)(1/c)] / [(P_f / P_r)(1/c)]$

$d\ln k = d\ln(P_f / P_r) = d\ln P_f - d\ln P_r$

Substituting (A.5) into (A.2) yields:

(A.6) $d\ln Q = d\ln X + d\ln P_f - d\ln P_r$ (C-D market-clearing)

QED

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Strategic Export Promotion Policy: An Introduction

Donald J. Liu[1]

Thank you, Harry, for the nice introduction. It's good to be back. It really brings back the memory of the good old days. I still vividly remember the first time I went with Olan to a meeting with a group of dairy farmers. Upon entering the conference room, Olan showered everyone in the room with warm and sincere personal greetings such as "How's the cow milking? How's the wife? and How was the hunting trip?" Immediately, I realized that Olan was a kind gentleman. Very soon after the meeting had started, Olan was faced with the question of how to improve the effectiveness of dairy farmers' advertising dollars. The question was framed within a rather complex and difficult business situation. Olan paused for about five seconds. Then, he replied with great composure and confidence, "You have to reposition yourselves in the market and improve the demographics." I thought, "Wow, how ingenious, how profound, and how appropriate." The lesson I learned that day was that the person I would be working for was not only a gentleman, but also an intellect. I have since coined the word "gentellect" to describe Olan in a concise manner.

The paper I will be giving today was presented four months ago to the NEC-63 regional research committee which Olan chairs. The title of the presentation was "Strategic Export Promotion Policy: An Introduction." The presentation was right after the lunch break. It was a good lunch, a big meal for everybody. Anyway, I think I really did a very good job in my presentation; so good that I couldn't help but notice that Olan was napping quite comfortably in his first row seat. In his committee chair seat, Olan napped all the way through. So, when Harry called me up a month ago about today's seminar, I told him, "Heck, I'll give the same paper because Olan probably won't notice it anyway." Harry was kind of concerned about this. To ensure that Olan won't notice the repetition of the presentation, Harry suggested that I change today's title slightly. Given my love for Italian opera, I now call it, **"La strategia politica della promozione delle esportazioni - Una introduzione."**

Olan, it is good to be here on such an important and memorable occasion, and it is good to see you again.

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Introduction

What does the word "strategic" mean? The S-word has been uttered so many times that every kid (new and old) on the block knows about it, and it wouldn't have been at all shocking had Mike Tyson announced (after wining his $20 million in 40 seconds) that when he was pumping iron in the big house, it was actually a strategic move. If we take the view of Friedman (p. 211), the strategy of a player is his total battle plan for the whole game. Following that logic, in an attempt to better position itself in a diverse market environment, the recent breakup of AT&T into three smaller units can be viewed as a strategic decision of the firm.

In addition to private agents and firms, governments and industrial organizations say the S-word as well. In this context, a strategic policy arises from the assumption that a government or industrial organization can credibly put itself as the first player in a multi-stage game and can influence the equilibrium outcome of the subsequent game played by private agents by altering the set of actions open to them (Spencer and Brander). Thus, the loan subsidy to Airbus (a four-nation consortium) provided by France, Germany, the U.K., and Spain can be regarded as a strategic policy because, as claimed by Boeing and others, Airbus probably would not have succeeded as a private project otherwise (Baldwin and Krugman).

Our topic is about the strategic use of export promotion by commodity organizations. How should we proceed with the discussion? One might suggest that we look at a couple of empirical studies involving strategic export promotion. Being a novice in this area, however, I know of few such studies that exist. Alternatively, we can sweat, and get down to the bare bones of strategic game playing by looking at a couple of theoretical pieces. This won't work either, given that we would like to conserve energy for the reception tonight. Rather, the approach we will be taking is to look at the basics, learn from simple examples, and focus on motivations and intuitions. We first introduce the seminal piece of Dorfman and Steiner. We argue that their monopolistic approach to advertising is not suitable for export promotion analyses, and provide a motivation to why an oligopolistic type model accounting for strategic interaction among firms is more appropriate. We then discuss the essence of oligopolistic games, especially within the framework of two-stage games. The two-stage game procedure is then summarized through a presentation of a simple strategic export promotion model. Much of the discussion in this paper relies on materials in Tirole.

The Dorfman-Steiner Model

Dorfman and Steiner consider the problem of optimal advertising for a monopoly. Denote the demand at price p and advertising level s by q = D(p,s) and production cost by C(q). The profit function can be written as $\Pi^m(p,s) = p\,D(p,s) - C(D(p,s)) - s$. The first-order conditions with respect to p and s are

$$(1)\quad D(p,s) - C'(q)D_p(p,s) = -pD_p(p,s)$$

$$(2)\quad pD_s(p,s) - C'(q)D_s(p,s) = 1$$

where $C' \equiv \frac{dC}{dq}$, $D_p \equiv \frac{\partial D}{\partial p}$, and $D_s \equiv \frac{\partial D}{\partial s}$. The first two terms in (1) give the profitability of an extra unit of output, while the third term reflects the effect of this extra unit on the profitability of inframarginal units. Likewise, the first two terms in (2) yield the benefits of an additional unit of advertising, while the last term the cost of that unit of advertising (which is one dollar).

Dorfman and Steiner manipulate the above two first-order conditions to yield

$$(3)\quad \frac{s}{pq} = \frac{\epsilon_s}{\epsilon_p}$$

where $\epsilon_p \equiv -\frac{\partial D}{\partial p}\frac{p}{q}$ and $\epsilon_s \equiv \frac{\partial D}{\partial s}\frac{s}{q}$, denoting the elasticities of demand with respect to price and advertising, respectively. Equation (3) dictates that the monopolist's optimal advertising/sales ratio is equal to the ratio of the elasticities of demand with respect to advertising and price. In particular, if the two demand elasticities are approximately constant, then the advertising/sales ratio is also a constant and is independent of the cost structure. The result is interesting because there is some empirical evidence supporting the constancy of advertising as a fraction of sales (Schmalensee).

The Dorfman and Steiner approach suffers at least two drawbacks. First, the model is static and, hence, is not capable of capturing such dynamic issues as the delay response and carryover effect of advertising (Kinnucan). A dynamic version of Dorfman and Steiner has been developed by Nerlove and Arrow, in which a firm's advertising expenditures contribute to a capital like goodwill which, in turn, affects demand. A second drawback of Dorfman and Steiner is its monopolistic treatment of the underlying market structure within which the firm operates.[2] As far as our export promotion topic is concerned, the second drawback is serious because rather than being a single seller, an exporting firm typically faces several major competitors coming from various exporting countries. Accordingly, an oligopolistic framework accounting for strategic interaction among major players in the field is more appropriate for export promotion analyses.

Prisoner's Dilemma

The importance of allowing for strategic interaction in a model when there are few players is well understood in the literature and can be sufficiently illustrated by the famous game of prisoner's dilemma. The story behind this game is that two prisoners are suspected of having carried out a double murder and are placed in separate cells (perhaps, to keep the more economically disadvantaged one from finding out that his[3] wealthier partner has a home theater installed in his cell and has been consuming brandy of an XO caliber). Knowing that the DNA evidence is at best circumstantial, the prosecutors offer each of the two prisoners the following deal: if the prisoner and his accomplice both confess to the crime, each will receive a sentence of three years, but if one prisoner alone confesses and his accomplice does not, he will receive an even shorter sentence of one year and his accomplice will receive a ten year sentence.

If the two prisoners are able to collude, it is clear that the best strategy for them is to deny the charge because they will both go free if neither of them confesses. However, neither prisoner has any way of knowing that his accomplice will remain silent (as they are kept in different cells). Hence, what preoccupies each prisoner is the chilly notion that he would be in bad shape if he denies the charge and his partner confesses. The prisoner would be "done in" under this situation because he would receive the most severe punishment of ten years (and his partner only one year). The payoff of this game is such that the dominant strategy for each player is to confess! That is, each prisoner decides to confess in the hope of getting just one year (provided that the partner does not confess) but knowing that he will get three years if his accomplice also confesses.

[2] This is also a drawback of Nerlove and Arrow.

[3] The usage of pronoun "his" is not meant to imply that men are more violent and, hence, more prone to crime than women, though empirical evidence tends to support this stereotype.

The outcome of the game is unfortunate for both parties; by not confessing, each would be able to go free instead of getting three years. Obviously, the outcome depends crucially on the assumption of the game. In particular, it would have been a completely different story if the defense had the benefit of competent legal counseling, such as that provided to Orenthal James Simpson by his dream team of lawyers. However, the moral of the story is lucid. In the Simpson case, the best strategy for the defendant was to deny the charge and blame it on Rio (or more precisely, on Detective Fuhrman), as there existed no co-defendant that could possibly "do him in." In our prisoner's dilemma case, on the other hand, it is not possible for each defendant to act unilaterally without worrying about the ramifications of his co-defendant's potential uncollegial behavior. Figuring into calculation in a decision-making process the effect of another player's action on one's payoff is the essence of strategic interaction.

The Bertrand Paradox

Consider the case of a one-shot duopoly game in which a homogenous product is produced by two firms using a constant return to scale technology. The key assumptions of the model are underlined. The profit of firm i (i = 1,2) is

$$(4)\quad \Pi^i(p_i,p_j) = (p_i - c)\,D_i(p_i,p_j)$$

where c is the unit cost of production, p_i is the price charged by firm i, and D_i is the demand for its output and is given by

$$(5)\quad D_i(p_i,p_j) = \begin{cases} D(p_i) & if\, p_i < p_j \\ \tfrac{1}{2} D(p_i) & if\, p_i = p_j \\ 0 & if\, p_i > p_j \end{cases}$$

The demand function in (5) says that consumers buy from the firm with the lower price and if the firms charge the same price, they split the market. In maximizing (4), the firms choose their prices simultaneously and noncooperatively. A Nash equilibrium in prices--a Bertrand equilibrium--can be formally stated as:

$$\Pi^i(p_i^*, p_j^*) \geq \Pi^i(p_i, p_j^*), \text{ for all } i = 1,2, \text{ and for all } p_i \in R_+.$$

One can think of the equilibrium as being characterized by a pair of prices (p_1^*, p_2^*) such that each firm's price maximizes its own profit, given the firm's correct anticipation of the other firm's price at equilibrium.

The Bertrand equilibrium for the above problem is to have the two firms charge the competitive equilibrium price: $p_1^* = p_2^* = c$. The intuition behind this result is that, for any other price p greater than c, a firm is always willing to undercut the price slightly (say, $p - \epsilon$) so that the firm can take over the entire market demand at that price, $D(p-\epsilon)$. Hence, firms price at marginal cost and do not make profits. This conclusion is extremely odd, and is referred to as the Bertrand paradox, because it suggests that the well-known price distortion associated with monopoly is only a special case as even a duopoly would suffice to restore competition and set the price right (Tirole, p. 210).

The Bertrand paradox can be resolved by relaxing any of the key assumptions of the model. For example, relaxing the static game assumption will do. In the one-shot game, firms simultaneously quoted their prices and then "disappeared." Thus, the best strategy for the firm would be to grab as large a portion of the market as possible as quickly as possible by charging the lowest possible price (i.e., $p = c$). However, the reality is that firms interact repeatedly and, therefore, have to be concerned about the subsequent reprisal of other firms when engaging in predatory pricing behavior. That is, oligopolistic firms should recognize their interdependence in a dynamic world and should be able to sustain a price higher than marginal cost. This is exactly the tacit collusion of oligopolists that Chamberlin was concerned about. Any firm thinking about undercutting the colluded price ($p > c$) would have to compare the short-run gain (arising from the increase in its market share) to the longer-run loss (due to the subsequent price war in which all firms revert to competitive pricing).

The above trade-off problem facing oligopolistic firms interacting in a setting of perpetual time has been rigorously studied by supergame theorists (e.g., Green and Porter; Rotemberg and Saloner). This literature is complex as the dynamics of price behavior are hard to analyze. Instead of mudding into this uncharted territory, we will resort to the more pragmatic framework of two-stage games.

Two-Stage Games

The second crucial assumption behind the Bertrand paradox is that the technology is of constant return to scale. The paradox can be resolved by the introduction of capacity constraints (or more generally, a decreasing return to scale technology). The idea is that when firms cannot sell more than the amount dictated by their capacities, there is no point for them to engage in cutthroat price competition, because an undercutting firm would only find itself facing the entire market demand which its capacity cannot satisfy.

In fact, since each firm wishes only to sell at the capacity (the total amount it has), price competition can often be subsumed in a manner in which firms choose the price ($p > c$) that allows them to dump their capacities on the market (Tirole, pp. 215-216). This is insightful because it suggests that one should look further into an underlying two-stage game model in which firms choose capacity in the first stage and then, upon observing each other's capacity, choose prices in the second stage. Since the preceding discussion presumes a binding capacity in the second stage price game, the solution for the first stage necessitates firms to accumulate low capacities (relative to the entire market size). As mentioned, the low capacity, in turn, softens price competition (i.e., $p > c$) in the second stage of the game.

Kreps and Scheinkman have shown that the outcome of the capacity-price type two-stage game is the same as that of the one-stage Cournot game. A Cournot equilibrium is such that each firm chooses its quantity given the quantity chosen by the other firm (thus, Nash in quantities). In a sense, the Cournot firms choose quantities and an auctioneer determines the market price that clears the market. This interpretation has given rise to criticism about the Cournot assumption because it is thought that prices are ultimately chosen by firms, not by auctioneer. The result of Kreps and Scheinkman suggests that it may be possible to vindicate Cournot by introducing capacity constraints and considering the Cournot profit function as a reduced form profit function in which second stage price competition has been subsumed (Tirole, p. 217). We will invoke this vindication later when presenting our export promotion model.[4]

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[4]Specifically, see footnote 10.

The two-stage game approach is attractive because it formalizes the idea that investment decision is generally made before price decision.[5] Also, it has broad applications because the investment decision in the first stage needs not be restricted only to capacity choices; it can be the choice of entry, location, product quality, etc. As pointed out in Tirole (pp. 216-217), these games often share a similar feature in that firms try to differentiate themselves from others so as to avoid the intense Bertrand competition associated with homogeneous goods (in the same way that firms avoid accumulating "too much capacity" in order to soften price competition).

Product Differentiation

The third assumption underlying the Bertrand paradox is that firms produce a homogeneous product. Under this condition, no firm can raise its price above marginal cost without losing its entire market share. In reality, however, this is not the case as some consumers are willing to buy from the higher priced firm because, say, it is available at a closer distance. The case of differentiated products is of interest to us because the intent of many advertising and promotion activities is to distinguish the advertised product from its competitors. We now use a differentiated-product example (Tirole, pp. 279-282) to illustrate the two-stage game approach discussed in the previous section.

Consider a "linear city" of length which lies on a line and consumers are uniformly distributed with equal density along this interval. There are two firms with the location of Firm 1 at point $a \geq 0$ and Firm 2 at point $1 - b$, where $b \geq 0$. For concreteness, assume that Firm 1 is to the left of Firm 2 (i.e., $1 - b - a \geq 0$). In buying the product, consumers incur a transportation cost which is assumed to be a quadratic function of the distance traveled. For simplicity, let each consumer consume exactly one unit of the good[6] and let the unit cost of production for each firm be a constant, c.

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[5]The game need not be restricted to only two stages. For example, Spencer and Brander consider a three-stage game in which competing firms are located in different countries. In the first stage, the governments make a prior commitment to subsidize R & D. In the second stage, firms choose R & D levels, given government subsidies announced. In the third stage, firms choose output levels, taking R & D levels as given by the preceding stage.

[6]Thus, we are assuming a unit demand function and the market is covered.

A consumer who is indifferent between the two firms is located at point x, where x is given by equating net prices that the consumer has to pay when buying from Firm 1 and Firm 2; i.e.,

$$(6)\quad p_1 + t(x-a)^2 = p_2 + t(1-b-x)^2$$

where t is the transportation cost for one unit of distance traveled. Solving (6) one obtains the demand for Firm 1:

$$(7)\quad D_1(p_1,p_2) \equiv x = a + \frac{1-a-b}{2} + \frac{p_2-p_1}{2t(1-a-b)}$$

Hence, the demand for Firm 2 is:

$$(8)\quad D_2(p_1,p_2) \equiv 1-x = b + \frac{1-a-b}{2} + \frac{p_1-p_2}{2t(1-a-b)}$$

The above two demand equations say that for equal prices Firm 1 and Firm 2 control their own turfs (or back yards, if you prefer) of size a and b, respectively, and split the market area located between them (i.e., $\frac{1-b-a}{2}$). The third term of each equation captures the effect on demand of the price differential.

Each firm chooses its price so as to maximize profit, given the price charged by the other firm. The profit functions are:

$$(9)\quad \Pi^1(p_1,p_2) = (p_1-c)\left(a + \frac{1-a-b}{2} + \frac{p_2-p_1}{2t(1-a-b)}\right)$$

$$(10)\quad \Pi^2(p_1,p_2) = (p_2-c)\left(b + \frac{1-a-b}{2} + \frac{p_1-p_2}{2t(1-a-b)}\right)$$

Differentiating (9) with respect to p_1 and (10) with respect to p_2, the two firms' first-order conditions are:

$$(11)\quad a + \frac{1-a-b}{2} + \frac{p_2 - p_1}{2t(1-a-b)} - \frac{p_1 - c}{2t(1-a-b)} = 0$$

$$(12)\quad b + \frac{1-a-b}{2} + \frac{p_1 - p_2}{2t(1-a-b)} - \frac{p_2 - c}{2t(1-a-b)} = 0$$

Solving the first-order conditions in (11) and (12) as a system, one obtains the Nash equilibrium in prices:

$$(13)\quad p_1^*(a,b) = c + t(1-a-b)\left(1 + \frac{a-b}{3}\right)$$

$$(14)\quad p_2^*(a,b) = c + t(1-a-b)\left(1 + \frac{b-a}{3}\right)$$

Notice that consumers differentiate the two products based on transportation costs. Thus, the higher the transportation costs, the greater the product differentiation. The equilibrium solutions in (13) and (14) indicate that the Bertrand result of marginal cost pricing is once again obtained if there are no transportation costs (i.e., $t = 0$). The solution also indicates that when t increases, both firms compete less strenuously for the same consumers and, hence, charge higher prices.

The above price game on differentiated products represents the second stage of the two-stage game that we have in mind. The two-stage game is the following: Firms choose their locations in the first stage, then, given the locations, they choose price in the second stage. For any given pair of locations, the price rules are in (13) and (14). We now "fold back the game" to the first stage by substituting the second stage price rules into the profit functions in (9) and (10) to obtain the associated reduced form profit functions:

$$(15)\quad \Pi^i(a,b) = \left\{p_i^*(a,b) - c\right\} D_i\left[a, b, p_1^*(a,b), p_2^*(a,b)\right]$$

where D_i are in (7) and (8) and p_i^* in (13) and (14). A Nash equilibriumin location is such that each firm maximizes its $\Pi^i(a,b)$ with respect to its location choice variable (*a* or *b*), given the other firm's location. The solution can be found by deriving the first-order condition for each firm from the reduced form profit function in (15) and then solving the first-order conditions as a system to obtain the equilibrium $a^*$and b^*. The location policy so obtained is said to be *credible* because it takes into account its effect on the second stage optimization, and the associated equilibrium is said to be *subgame perfect.*[7]

The location problem has been solved by d'Aspremont et al., which shows that the equilibrium requires the two firms locating at the two extremes of the city so as to maximize the extent of product differentiation and, therefore, minimize price competition. The maximum differentiation result of d'Aspremont et al. is reproduced by Tirole using a simpler, and yet insightful, approach. Let's focus on the first firm and differentiate its reduced form profit function in (15) with respect to *a*:

$$(16)\quad \frac{d\Pi^1}{da} = \frac{\partial \Pi^1}{\partial p_1}\frac{\partial p_1^*}{\partial a} + (p_1^* - c)\left(\frac{\partial D_1}{\partial a} + \frac{\partial D_1}{\partial p_2}\frac{\partial p_2^*}{\partial a}\right)$$

The first term on the right-hand side of (16) measures the indirect effect of *a* on Π^1 through the change in own price. The second term on the right-hand side of (16) is the *market-share effect* capturing the direct impact of *a* on Π^1, while the third term the *strategic effect* accounting for the indirect effect of *a* on Π^1 through the change in the rival's price. Due to the envelope theorem, the first term on the right-hand side of (16) is zero because Firm 1 maximizes Π^1 with respect to p_1 in the second stage (i.e., $\frac{\partial \Pi^1}{\partial p_1} = 0$). Using (7), (13), and (14), one obtains

$$(17)\quad \frac{\partial D_1}{\partial a} = \frac{3 - 5a - b}{6(1 - a - b)} > 0 \quad \textit{if } a < ½ \textit{ (hence } b < ½ \textit{ as well)}$$

[7]A subgame perfect equilibrium is a set of strategies for each player such that in any subgame the strategies (truncated to this subgame) form a Nash equilibrium.

$$(18) \quad \frac{\partial D_1}{\partial p_2}\frac{\partial p_2^*}{\partial a} = \frac{a-2}{3(1-a-b)} < 0 \quad \text{if } a < ½$$

Substituting (17), (18), and $\frac{\partial \Pi^1}{\partial p_1} = 0$ into (16) one verifies that $\frac{d\Pi^1}{da} < 0$. Hence, Firm 1 always wants to move leftward, consistent with the maximum differentiation principle obtained by d'Aspremont et al. Notice that equations (17) and (18) exhibit an interesting conflict between the market-share effect and strategic effect of the location choice. On the one hand, (17) indicates the desire of the firm to move toward the center of the linear city so as to increase its market share given the prices. On the other hand, (18) acknowledges the firm's wish to move away from its rival so as to increase product differentiation and, therefore, raise the price. The net result shows that the strategic effect dominates the market-share effect.

Strategic Export Promotion

In the previous example of two-stage games, firms compete in both stages. In the literature on strategic use of trade and industrial policies, however, the setting is slightly different. Typically, one has a situation in which firms from different countries play a Nash type game (e.g., Nash in quantities or Nash in prices) in the second stage, given government policies. To give its firms a strategic advantage in marketing their products, each government precommits to its policy by playing games against other governments in the first stage (i.e., Nash in policies). In other words, firms play Nash against other firms, and governments play Stackelberg against firms and Nash against other governments. For example, in a model in which one home firm and one foreign firm (both Cournot firms) produce a homogeneous product and compete in a third-country market, Brander and Spencer find that if the home country's government can credibly precommit itself to pursue a particular trade policy before firms make production decisions, then an export subsidy is optimal. Extensions of Brander and Spencer's model are abundant (e.g., see Eaton and Grossman, and Cheng, and the citations therein).

The success story of applying the two-stage game framework to identify optimal trade and industrial policies is encouraging, because it points to a new direction for future export promotion research. The traditional approach for export promotion study is to focus exclusively on the effect of promotion activity on the foreign demand in question. This approach ignores the basic reality that there are also other exporting countries competing directly with the country sponsoring the promotion. For example, the U.S. and Australia have been competing directly in the Japanese beef market, and the U.S. and Canada (among others) in the Japanese pork market. It is naive to ignore the action of one's archrival when devising an export promotion policy.

As a way of summarizing the procedure, consider the following two-stage game in which the U.S. and Australia are competing in the Japanese beef market. For simplicity, assume there is only one exporting firm in each exporting country.[8] In the second stage of the game, the exporting firm from each country chooses its export volume, given the demand condition for its product in Japan. In the first stage of the game, the commodity organization in each exporting country chooses its promotion activity mix and level, attempting to shift the Japanese beef demand in its constituent firm's favor.[9] In other words, the commodity unit chooses its export promotion policy strategically so that the activity of its constituent exporting firm at a later time is facilitated.

Conditional on the promotion level conducted in the first stage, the Japanese inverse demand equation for firm *i*'s beef (i = u and a) can be specified as $p_i = p_i(q_u, q_a \mid s_u, s_a)$, where subscripts *u* and *a* denote the U.S. and Australia, respectively. Thus, the firm's profit function in the second stage quantity game can be written as: $\Pi^i = \Pi^i(q_u, q_a \mid s_u, s_a)$. The associated first-order condition can be written as $\Phi^i(q_u, q_a \mid s_u, s_a) = 0$, where Φ^i denotes $\frac{\partial \Pi^i}{\partial q_i}$. The effect of s_i on the equilibrium export volume can be assessed by totally differentiating $\Phi^u = 0$ and $\Phi^a = 0$ with respect to q_u, q_a, and s_i, and then solving the resulting system for $\frac{\partial q_k}{\partial s_i}$ (K = u and a). Alternatively, through solving the firms' first-order conditions as a system, one obtains the equilibrium export volume as a function of the promotion levels: $q_i^* = q_i(s_u, s_a),\ i = u, a$.

Having obtained the quantity rule for the second stage game, one proceeds to the first stage. It is assumed that the objective of the commodity unit is to maximize industry profit. Then, the

[8]For a more general case of many exporting firms, see Liu.

[9] By invoking the Cournot justification discussed previously, behind this two-stage export promotion model is a (perhaps, more realistic) three-stage game: the commodity units play Nash policy in the first stage, the firms play Nash (export) capacity in the second stage and Nash price in the third stage.

reduced form objective function of the ith commodity unit can be written as $V^i = V^i(q_u^*, q_a^*, s_u, s_a \mid \zeta_i)$, where ζ_i represents exogenous parameters facing unit i. The associated first-order condition can be written as $\Psi^i(q_u^*, q_a^*, s_u, s_a \mid \zeta_i) = 0$, where Ψ^i denotes $\frac{\partial V^i}{\partial s_i}$. The effect of ζ_i on the equilibrium promotion level can be assessed by totally differentiating $\Psi^u = 0$ and $\Psi^a = 0$ with respect to s_u, s_a, and ζ_i, and then solving the resulting system for $\frac{\partial s_k}{\partial \zeta_i}$ (K = u and a). Alternatively, through solving the commodity units' first-order conditions as a system, one obtains the equilibrium promotion level as a function of the exogenous parameters facing the units: $s_i^* = s_i(\zeta_u, \zeta_a),\ i = u, a$. Now, let's go to the endgame.

Summary

It is a strategic policy of a firm when the firm bases its location choice not just on where the demand is, but also on how the choice will affect the extent of price competition among rivals. It is a strategic policy of a government when the government credibly precommits itself to a level of export subsidy before firms make production decisions. The analysis of strategic policy can be conveniently conducted within a multi-stage game framework, in which emphasis is on the role of firm or government's irreversible investments in establishing market power for private agents by enlarging the opportunity set that the agents will face. The multi-stage game approach is attractive not only because it formalizes the idea that investment decision is generally made before price or quantity decision, but also because it has broad applications attested to by the trade and I.O. literature. The success story of the multi-stage game approach points to a new direction for future export promotion research. In particular, one can think of a framework that features a commodity organization precommitting its export promotion policy strategically so as to facilitate the export activity of its constituent firms at a latter stage.

Having introduced this game-theoretical approach to export promotion, it is now up to Olan and his team to dig in and get down to the bare bones of it. Olan, you do have a plan for this, don't you?

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A Tribute to Olan Forker
Ron Ward

First, I sincerely apologize for not being able to attend this tribute to Olan. As you are reading this letter, my wife and I are on our way to Spain. Otherwise, I would be there. Please give everyone my best regards, and give Olan and Katie an extra hug from my wife. It is truly wonderful how friendships evolve and remain over the years. My wife and I became close to Olan and Katie during the last few years after their sabbatical in Florida. Every time we go to the beach, there is still a part of Olan and Katie just up the road from our place. Before turning to the heart of this letter, Geraldine and I send our congratulations to both Olan and Katie. Just like a marriage, it takes both to develop and support a career.

Webster defines retirement as, "....the state of being retired from one's occupation. Seclusion or privacy." Knowing Olan, this definition will have to be rewritten. For Olan, retirement will be the opportunity to: interact with hundreds of friends and colleagues, sail the world, accumulate frequent flier mileage, spend time with his family, work on those home projects, and take another long trip to Florida. I am not sure that retirement will change their life that much because Olan always had time for these things. Olan never failed to give that extra hand and smile. He was a great administrator and a supportive faculty member. He took time to sail and relax. He was supportive of his family. In looking at Katie and Olan's home, I am sure he finished those "honey do" projects on time. When I add all those activities up, I see a caring and nurturing individual who has given unselfishly to his friends and family. The great thing about retirement, however, is that he has JUST STARTED!

Before turning to a few comments about professional activities, I want to give a special recognition to Katie. Katie has been a wonderful wife, friend, and confidante to Olan. She has been supportive, caring, and the foundation of Olan's career. She has excelled with her own activities while raising a family, sailing, and traveling the world. If Katie is in the room today, Geraldine and I extend our warmest congratulations to you and, of course, you have an open invitation to return to Florida. My wife said that we still have time to spend those "planned" royalty checks. I will not take time to explain this but let Katie do that later.

Let me now turn to several topics relating to Olan's professional career. Without question, Olan has made a remarkable contribution to the agricultural economics profession. He has been an outstanding administrator, organizer, researcher, and speaker. As we all know, his major contributions lie in the areas of commodity marketing and commodity promotion programs. Olan has been a major leader in bringing commodity advertising researchers and commodity groups together to jointly deal with all aspects of promotion programs. With his efforts, our commodity advertising research has and is being used by commodity groups, advertising agencies, and government administrators. His leadership with NEC-63 has provided the core for bringing these groups together in an open forum where everyone participates. All parties involved in commodity programs have benefited from this open structure. While at times there will be criticisms and questions about specific research findings, the important point is that through a linkage, such as has been developed with NEC-63, industry groups are trying to understand and use the research. To me, that is the best indicator of the importance of the groups' research efforts. Olan, you need to take much pride and pleasure in knowing your leadership has truly made a major contribution to numerous commodity groups and to your colleagues.

Olan is a world traveler and seems at home in any setting. I once passed a restaurant in Madrid where the sign said, "....Hemingway did not eat here." In a large part of the world now, we probably could put a new sign that says, "Forker ate here." Olan, I have always admired your ability to organize trips, give talks effortlessly, and to interact with both small and large groups in any setting. You pitched in for me at the last minute on one trip to Spain. Within a very short period of time, you and Katie were ready to go and, as usual, were completely organized. As you adjust your schedules with your retirement, I know that your international experience will be in great demand. ***Just do not try to sail to every foreign meeting!***

Olan's published output is remarkable. It is of the highest quality and is referenced extensively. His leadership in the dairy industry has a long history and his impact on program development is clearly evident. Several faculty, with many probably in the audience, at one time worked with Olan as a research associate and now are successful with their own professional activities. Having a positive role in professional guidance and instilling strong values through his actions are among Olan's more important contributions. The wide respect for Olan is a reflection of his honesty and professional commitment to his colleagues.

A few years ago, Olan and I made plans to publish a book on commodity advertising. We struggled with the outline and content and divided the chapter responsibilities. This process was a great experience. There was not one moment where we had disagreements or controversies. He did have to get me out of the office occasionally to focus on finishing this project. If you have sand in your copy, you can contribute that to Olan's writing on the beach. ***It was a rough assignment!***

While I have not been under Olan's administrative leadership, it is clear that he is well respected by his colleagues at Cornell. Administering a department is no small task and Olan should be commended for his tireless contributions to Cornell. His administrative skills have carried over to programs in Central Europe and, of course, the commodity promotion center.

In closing, I congratulate Olan on his retirement and wish him the best as he expands his horizons -- if that is possible! His impact on programs and people have and will continue to leave an enduring legacy. To Katie, thanks for being a friend and inspiration to so many.

Olan Forker's Contribution to Commodity Promotion Economics[1]

Stanley R. Thompson[2]

To the average citizen, advertisements are viewed, at best, as clever and entertaining, at worst, deceptive and annoying. To the professional analyst, advertising represents an area of inquiry to be studied. But to me, advertising is more than a subject to be studied -- it brings to mind helping people and establishing personal relationships and professional goals. This event today celebrates an individual who has devoted a good portion of his professional career to the economics of advertising -- and virtually his whole career to helping people establish personal relationships and professional goals. Olan, it is an honor to be here today and to share this occasion with you and your colleagues.

Some events in life are etched in our memories even though they happened many years ago such as, the assassination of J.F.K., or Neil Armstrong's "giant step for mankind." Most of us remember exactly where we were and what we were doing at the time of such momentous events, events that would have a profound impact on our world. In addition to those shared memories, we each have memories of events that had an impact on our personal lives. Although I don't remember the exact date, such an event occurred in my life one evening in 1972 after arriving home from work at Sunkist Growers in Southern California. I received a life changing telephone call from a person whom I had never met, but unknown to me at the time, he would later become my lifelong mentor and friend. Olan called me that evening to offer me the opportunity to pursue a Ph.D. at Cornell. Being young and naive, I accepted quickly with little thought given to its life changing implications.

Today, I would like to highlight Olan's career from the eyes and ears of a former student, a career that spans over four decades. Equipped with the strong values instilled by his parents on a farm in Kendallville, Indiana, Olan went on to become a star among the many products of our nation's land-grant university system. He earned his B.S. degree in 1950 in Dairy Production from

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[1]Paper presented at the Cornell University seminar, "Commodity Promotion Economics," February 2, 1996, in honor of Professor Olan D. Forker's retirement.

[2]The author is professor and chair, Department of Agricultural Economics, The Ohio State University, Columbus, Ohio 43210-1067.

Purdue University. After serving in the U.S. Army during the Korean conflict, he returned home to Indiana as a professional farm manager. Enlightened with the importance of economics to agriculture, he entered the agricultural economics program at Michigan State where he received his M.S. in 1958. He continued his graduate studies at the University of California, Berkeley, where he earned the Ph.D. in 1962. Olan was asked to remain at Berkeley as a Dairy Extension Economist. When the opportunity came in 1965 to join the faculty at Cornell, Olan and Katie must have concluded "there is more to life than good weather" and packed up the family and moved to Ithaca. I imagine that Katie would agree that life has never been the same since.

Building upon the firm foundation that he established in California, Olan continued his work in Dairy and Poultry Economics at Cornell. During the early 1970s, Olan's interest focused more on dairy with special attention to the economics of commodity advertising and promotion. At that time, an expanded New York State Fluid Milk Promotion Program provided the opportunity to serve the dairy farmers of New York by evaluating the benefits and costs of the expanded program. Through this effort, Olan's work in program evaluation was launched.

Prior to the early 1960s, the evaluation of commodity advertising programs typically involved the examination of product sales before and after an advertising campaign. These naive models were quickly recognized as inadequate. This led to the introduction of controlled experiments within selected markets, but they were very expensive to conduct (Clement, Henderson, and Eley). The need for program evaluation kept growing, yet sufficient observational data were not available for most problems. As these data became available, statistical models were built. Efforts generally involved the estimation of *ad hoc* single equation econometric models where advertising expenditures were specified as arguments in the market demand function. At the time, researchers focused on the estimation of both short- and long-run advertising elasticities and the nature of advertising lag structure.

In the search for prescriptive information regarding optimal expenditure levels, Nerlove and Waugh's (1961) classic article on advertising without supply control received added attention. Since their conceptualization was judged appropriate for relatively competitive commodity markets, a Nerlove-Waugh type framework was adopted for the examination of the effect of supply response on milk advertising effectiveness (Thompson, Eiler, and Forker). Some of the earliest econometric models of advertising effectiveness were built by Ron Ward at the University of Florida and here at Cornell University by Olan Forker, Doyle Eiler, and myself. I must emphasize that the work done here would not have been possible without the help of Tim Mount. In sum, during the early 1970s, focus was placed on the choice and estimation of the appropriate statistical model.

During the 1980s and into the early 1990s, significant energies went into extending previous applications and testing new models. For instance, concern over the relevance of static models to some applications led to the application of control theoretic and other dynamic structures. Olan's 1990 *AJAE* article with Donald Liu was a significant contribution to this literature. Also, the role of market structure in program evaluation received attention. Researchers questioned whether competitive markets typify all generic advertising environments. Again, Olan and his colleagues provided an empirical application of advertising effectiveness within an imperfect competition model (Suzuki, et al). Don Liu's paper this afternoon extends this line of thought to the understanding of promotion strategies within imperfect markets.

As work progressed, more attention was devoted to articulating the theoretical underpinnings of our response models. Investigators began to question whether their empirical models were consistent with consumer preference theory. Thus, we saw the emergence of demand systems approaches to the measurement of advertising and promotion (Brown and Lee). Since demand systems models, by definition, include multiple commodities, theoretically consistent estimates of the horizontal market relationships in the form of cross-elasticities are obtained. However, equally important was the need to gain an understanding of the vertical transmission of advertising effects from retail to farm-level. Here, again, Olan and his colleagues were contributors to understanding of the role of advertising among the vertical relationships within milk markets (Kaiser, et al; Liu, et al).

More recently, we have observed the application of equilibrium displacement models (Muth). Within these models, the analyst can allow for both the horizontal and vertical market displacements. For example, Piggott, Piggott, and Wright (PPW) specified an equilibrium displacement model within an advertising evaluation context where commodities are related both in demand and supply as well as in multiple markets. PPW provided some insight into the distinction between statistically significant results and profitability; although statistically significant advertising effects were found in domestic markets, the export sales substitution effect entirely eliminated profits. As we heard earlier this afternoon, Henry Kinnucan examined the substitutability of non-farm inputs for farm inputs as the price of the farm input rises due to advertising. Since PPW did not explicitly examine the vertical linkages, Kinnucan's paper is the first effort to truly account for both vertical and horizontal market relationships within an equilibrium displacement model of advertising evaluation.

A constant during a major period of empirical change was Olan's consistent attention to data; he stressed the importance of the type and quality of data needed to measure effectiveness of dairy advertising. Olan's ability to "see the forest" reminded us all to stop and think about our data before we became too preoccupied with torturing the data with our computers. His project with the National Dairy Promotion and Research Board is a major contribution stemming from Olan's concern about data. Data quality and needs remain a major issue today.

Certain to become a classic, an important contribution to the literature is his 1993 book with Ron Ward, Commodity Advertising: The Economics and Measurement of Generic Programs. As summarized in the recent *AJAE* book review, "Commodity Advertising is the first book to integrate the background, theory, political dimensions, and empirical analysis of generic programs into one work and from that standpoint is a substantial contribution" (Schiek). This book is a masterful integration of the literature and a synthesis of Olan's own work. To those who were skeptical, something truly significant did come out of that year on the beach in St. Augustine.

Over time, the evolution of the commodity advertising evaluation literature has developed according to the specific problem to be addressed, the availability of data, the increased role of economic theory, and the degree to which the *ceteris paribus* assumption is relaxed. It is clear that Olan Forker's handprint is on every evolutionary stage of the literature.

Perhaps Olan's greatest contribution is his ability to organize, motivate, and facilitate others in a quiet and unusually effective manner. He has the ability to bring out the best in others and create a synergy that few can attain. Two examples come to mind. First, Olan recognized the need for a forum where researchers and industry representatives could share their interest in generic advertising. With the assistance of Walt Armbruster at the Farm Foundation, Olan organized NEC-63 "Research Committee on Commodity Promotion;" he served as chairperson until his retirement from Cornell. Through this committee, Olan inspired continued research and collaboration on commodity promotion economics that remains strong today. The leadership he provided to this effort is highly valued by his colleagues, commodity groups, and the advertising industry.

Building upon NEC-63's accomplishments, the second example is Olan's hand in establishing and directing the National Institute for Commodity Promotion Research and Evaluation (NICPRE). This institute would simply not have been possible without Olan's careful shepherding of it through the delicate political process required for Special Grant approval. NICPRE represents a capstone institutional building effort to ensure that significant intellectual energies continue to be directed toward promotion research and evaluation.

Over the years, Olan's influence on people like Henry Kinnucan, Don Liu, Harry Kaiser, John Lenz, myself, and countless others has profoundly impacted our profession. Not only is Olan a professional mentor to us all but also an admirable example in balancing career and family life. Again, it is an honor to be here today and share this occasion with you.

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Olan Forker's Contribution to the New York State Milk Promotion Order

Skip Hardie[1]

Thank you for allowing me the privilege of honoring Olan Forker. My name is Skip Hardie, and I am a dairy farmer who is lucky enough to chair the New York State Milk Promotion Board Advisory Board. This board has funded some of Olan's research for about 24 years.

When legislation was passed back in 1971 to set up the promo board, the board members felts quite strongly about several things. They wanted to have an unbiased entity measure the effectiveness of their advertising. They wanted to be able to make knowledgeable decisions on how to allocate dairy farmer promotion dollars to different types of dairy products. Also, they wanted to be able to show the dairy farmers who were funding milk advertising that they were getting real value for the money they were contributing. So, they turned to a Cornell professor who had a statistical background in Agricultural Economics and asked him for help.

Olan Forker exceeded their wildest dreams. Using statistical modeling and actual retail sales figures, Olan was able to show these fairly skeptical farmers several things. First and foremost, the effects of advertising on a generic commodity could be measured. Second, advertising could actually net dollars to a dairy farmer's bottom line. Third, different dairy products had different responses to different levels of advertising.

In what has become a classic example of farmer-directed research, the cooperative efforts between Olan and the promotion board have paid handsome dividends for both parties. The dairy farmers of the state have always had a clear picture of the value of their advertising dollars. In return, Olan has been able to attract a long line of top shelf researchers, most who have gone on to distinguish themselves in varying aspects of commodity promotion. Many of these people are here today, and their names are a veritable "Who's Who" of generic commodity promotion.

Olan has another trait that he might not always be saluted for, and I think this is an excellent time to commend him. He is a genuinely nice guy. Now, that may sound like a fairly general statement, and it is. Let me put it into context. This has happened on more than one occasion. Picture this. Olan has just finished giving a fairly lengthy presentation at one of our board meetings.

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[1]The author is the chairman of the New York State Milk Promotion Order.

He has used terms that our farmer board members can understand. It is really pretty interesting stuff, and I can see that some of the board members are anxious to get right into the meat of Olan's presentation; however, one particular board member would like something clarified. Fine. After listening to the board member's question, it is obvious that all of Olan's presentation has missed its mark on this person. They were so intent on asking their question that they completely missed what Olan was trying to get across. This is where the "nice guy" part comes in. Olan answers the question, and then proceeds to give a simple synopsis of his presentation to this person so that they aren't lost in the fog for the rest of the meeting. He can communicate with farmers at any level. Nice guy.

That would explain the success Olan has enjoyed. He is so well respected in his field that he has been able to establish NICPRE. Yet, he is so down-to-earth that he can explain the complexities of computer modeling to predict the economic impact of advertising to our farmer board.

The reason I'm on this board is simple. Our farm contributes a lot of money to advertising. I'm a firm believer in advertising, and I wanted to make sure the job was being done in as good a manner as possible. The different advertising campaigns that dairy farmers have used over the years have enjoyed varying degrees of success. I personally have some concerns about the "Got Milk?" series of ads. Do humorous ads sell? What about the burn-out factor? Then, I kind of smile to myself as I remember that Olan Forker has been laying the groundwork for quite a few years now, groundwork that measures what farmers really need to know. Will it really sell more milk?

Thank you, Olan, and thank you to the whole Forker family. It has been my privilege to spend some time with all of Katie's and Olan's children, and I can tell you that they are a wonderful group of people. Enjoy your retirement!

Evolution of Mandatory Commodity Promotion Programs: A Personal View

Olan D. Forker

Introduction

Commodity promotion programs have been around for at least 100 years. I became a student of these programs in the early 1970s when the New York Milk Promotion Advisory Board asked the department, through Herb Kling, to help them determine whether or not the program created positive economic benefits to New York dairy farmers. The dairy farmers had just obtained enabling legislation for a mandatory assessment on all milk produced in the state.

New York state dairy farmers had been providing funds on a voluntary basis for promotion and research for many years. However, as one might expect since it was voluntary, a number of dairy farmers did not contribute. This is a typical free-rider problem in which a few members of an industry support industry-wide programs benefiting everyone. In a competitive market, those who do not provide support for industry-wide activities receive the same benefits as those who do. To solve the perceived free-rider problem, industry leaders managed to get a law passed which required everyone to contribute based on marketing volumes.

The dairy farmers, appointed to the first advisory board, felt strongly that some means should be established to monitor and measure the economic benefits, if any, of the program. As good businessmen, they were interested in the return-on-investment generated by the dollars that they had contributed. I, somewhat reluctantly at the time, took on the responsibility of conducting the analysis, but as I and my colleagues got more involved and learned more about the economics of mandatory programs, we became more and more interested. My involvement over the past 23 years or so has been very exciting and rewarding.

The story of how mandatory agricultural commodity promotion programs evolved from the early voluntary arrangements provides an exciting example of the coming together of economic and political forces. In this presentation, I will try to provide my perceptions of how and why this all came about.

History

In the late 1800s, state governments used taxpayer money to promote the agricultural industry and the marketing of the major home-grown commodities of their respective states. Over time, the use of state funds (taxpayer) for such purposes became unpopular and, in some cases, declared unconstitutional. There was also a realization that one state could not easily differentiate its home-grown commodity from that of another state.

As commodity groups looked for ways to influence the market demand for their output, informal arrangements were made and evolved into various voluntary arrangements. For example, in 1915, milk producers and dealers from around the U.S. combined to organize Dairy Council, Inc., with the focus on nutrition education. In addition, they supported nutrition research to back up the education program. Twenty-five years later, in 1940, the industry formed the American Dairy Association to conduct media advertising. Later, Dairy Research, Inc., was formed to focus on new product development. In 1971, these three organizations merged into the United Dairy Industry Association. All of the early growth in commodity promotion was based on voluntary contributions. By 1971, several states had adopted mandatory checkoff programs for dairy as well as other commodities, but some states had not; therefore, the commodity groups still had a free-rider problem. Twelve years later, in 1983, the dairy industry convinced Congress to pass a nationwide mandatory assessment program.

In California, mandatory programs came into existence with the passage of marketing order legislation in the 1930s and the later passage of legislation to authorize commodity commissions and more recently, commodity councils.

During the era of voluntary contributions, various means were used to encourage or make it easier for farmers to contribute. The most effective was a procedure referred to as the "positive letter." For milk, the letter was written through the federal milk market administrators' offices. Processors were required to deduct an assessment from a producer's milk check unless the producer asked in writing that the amount not be taken out. Thus, the producer had to write a "positive request" to not participate.

Many producer groups, in an attempt to solve the "free-rider problem" turned to state legislation for laws to require everyone to support their commodity promotion programs. Many states did introduce enabling legislation for the establishment of checkoff programs for the promotion of specific commodities. California was a leader in this area with the establishment of its Marketing Order legislation in the mid 1930s, which authorized promotion along with provisions for supply management in addition to grades and standards. The first state to pass commodity specific legislation for a mandatory, non-refundable assessment was Florida with the establishment of the Florida Citrus Commission in 1935.

Mandatory assessments at a national level were first introduced in the Agricultural Marketing Agreement Act of 1937. In all cases, as was true for some state programs, the farmers could ask for a refund. Rules concerning refunds varied across commodities and states. Most cases required that the assessments be collected and that the farmer make a written request during a certain time frame for the refund of the money that had been subtracted from their payment.

The national policy concerning refunds changed in the 1980s through legislative action. The first break from the previous policy was the enactment of the Dairy Promotion and Research Act of 1983. The act authorized a national assessment on all milk marketed in the 48 states, it contained a "no refund" provision, and the assessments were to begin prior to a referendum of producers. A similar act for honey was passed in 1984. In 1985, delayed referenda programs were authorized for pork, beef, and watermelons. For these commodities, refunds up to a specified limit were authorized until the program was approved by referendum. Then, in the 1990 Farm Bill, Congress included mandatory assessment authority for soybeans, fresh mushrooms, pecans, and limes as well as assessment authority for fluid milk processors.

The federal mandatory assessments were preceded, in the case of almost every commodity, by mandatory assessment programs at the state level. As one looks at the history, it seems that a precondition to the passage of legislation authorizing a national assessment was the existence of a number of state checkoff programs and a voluntarily supported national organization (either a promotion organization or a trade organization) for that commodity. These had to be in existence to complete the lobbying and industry public relations work and to support and coordinate the start-up of the national program.

The reasons for the evolution toward mandatory programs at the state and then the national level are many, but a small number of important and logical economic and political reasons have been at the center of this evolutionary process. I will first discuss some of the economic reasons and then some of the political reasons.

Economic Reasons for Mandatory Programs

Let's start with the economic reasons. First, commodities by definition are homogeneous products and are almost always sold in a competitive market. Second, producers are continually looking for some solution to the continuous problem of their overreaction to price changes. Third, group action (individuals acting together) can sometimes accomplish movement in the marketplace where separate individual actions cannot. Fourth, voluntary programs have an economic "free-rider" problem. I will expand on each.

- A Homogenous Product -- A Competitive Market: If the product or commodity is homogeneous and the number of sellers or producers is large, no single producer can influence the price. An individual producer can increase his total revenue only by increasing production volume. Of course, if all producers increase production, prices must fall to clear the market. The reverse is true when supplies fall; prices go up. All producers gain from a price increase or lose from a price decrease in proportion to their market share. All of you are aware of this phenomena. Hence, if something happens to expand demand, either from external forces or through the unplanned and uncoordinated action of individuals or through group action, everyone who sells the commodity shares in the gain or loss in proportion to their sales volume. Thus, in the case of generic commodity advertising, the effort increases overall demand. The total revenue for a given level of production of the commodity will be greater than it would have been if the advertising effort had not been undertaken.
- Excess Supplies and Low Prices: From a practical viewpoint, the real motivation for promotion programs and, subsequently, mandatory programs came about during periods of heavy market supplies and relatively low

prices. Promotion seemed to provide one possible solution to the low price problem. Spend more money on advertising to convince everyone to buy more of a product. If successful, we can advertise our way out of our problem. Many, of course, had unreasonable expectations.

- The Ability to Influence Aggregate Demand Through Group Action: Producers, large in number but small in relative size, concluded many years ago that they were at the mercy of the market, and if they were to have any influence on demand, they would have to work collectively. Thus, it has been the tradition of farmers to form cooperative efforts in the purchase of inputs and in the marketing of their output. For many years, the feeling that group action to advertise and promote could increase demand was mostly a matter of faith. During the past decade, enough studies have been completed that indicate conclusively, in my opinion, that collective action through commodity promotion programs can increase aggregate demand to the point where everyone is better off. However, this gain is seldom, if ever, transparent to the individual who pays into the program.
- The Free-Rider Problem: The major issue that now faces the industry has to do with how benefits and costs are shared. If everyone is required to pay into a pool according to the volume marketed, then the gains (also distributed according to volume marketed) are distributed equitably, in proportion to the individual's contribution.

Prior to 1990 when the national programs authorized refunds, many producers asked that their money be returned. The refund level to the American Egg Board after 14 years had grown to 45 percent. For the cotton program, refunds after 22 years had grown to 35 percent. The refund level for the national potato program had grown to 18 percent after 17 years. The refund provisions for all three of these commodities were eliminated in the 1990 Farm Bill as a reaction to the perceived free-rider problem.

Political Reasons for Mandatory Programs

Commodity promotion programs evolved not from economic reasons alone. There were political reasons as well.

- The Power of Special Interest Groups and the Importance of Agriculture: Agriculture has always had a strong voice in the development of state and federal enabling legislation. Without the strong voice and the existence of trade organizations to speak for agricultural interests, mandatory programs, (despite the existence of various economic reasons), would not have come into being.
- Reduce the Cost of Government-Supported Programs: The enabling legislation for the mandatory national dairy program in 1983 came about in large part because of the high cost of the government price support program. The Dairy Promotion Act was part of a larger piece of legislation designed to reduce the cost of supporting the dairy industry. The Act had a two-part thrust. One was to reduce supplies through lower support prices and a reduction in the number of dairy cows. The second was a mandatory assessment for promotion, designed to concurrently increase demand.

Legal Challenges to Mandatory Programs

The most recent legal challenges to the continued existence of commodity checkoff programs (mandatory promotion programs), must be viewed in the context of history. The evolution toward mandatory programs was a movement toward less freedom of choice. No matter what the legitimate economic rationale for them, they do take resources from producers that are then devoted to a common cause. This raises questions of equity, freedom of choice, and opportunity costs. Prior to this past year, most legal challenges were decided in favor of the continuation of mandatory programs. The recent challenges and court rulings seem to conclude that the mandatory limitation on choice is in violation of the constitution. The courts have placed the burden of proof that the program generates a greater individual benefit than the individual's cost on the promotion organizations or the government. Currently, little actual research has been done to determine whether individual producers could receive more direct benefits if they invested the same amount of money privately.

Closing Comments

The current mandatory commodity promotion programs have come about through a logical process of an industry's reaction to economic forces and political opportunities. Voluntary promotion programs arose because of a feeling of helplessness in the marketplace; a feeling that farmers could influence demand for their output if they joined together, pooled resources, and mounted a commodity promotion program. Because of the free-rider problem, the voluntary programs evolved into mandatory state programs and then into mandatory national programs. Economic studies provide sufficient evidence that the joint efforts of mandatory programs can increase demand, and in most instances, the increase is enough to offset the costs of the program. The mandatory programs, ignoring the freedom of choice issue, come closer to making sure that those who benefit also share in the cost.

The future evolution of mandatory programs may now be in the hands of the courts. The challenge to applied economists interested in this issue is for them to consider ways to address the freedom of choice issue. Are individuals better off or worse off from being denied choice in the investing of a portion of their income?

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