FOREIGN MARKET PROMOTION PROGRAMS: AN ANALYSIS OF PROMOTION RESPONSE FOR APPLES, POULTRY AND TOBACCO

by

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Abstract

U.S. exports of apples, poultry, and unmanufactured tobacco were analyzed using regression techniques to determine their responsiveness to foreign market development expenditures. It was determined that apple and tobacco exports were responsive, while poultry exports were not. Marginal returns to an additional dollar of export promotion for apples and tobacco were $60 and $31, respectively. Results indicated that response to poultry promotion was not different from zero. This is likely due to aggregation of data which does not permit isolating impacts of specific promotional efforts.

Key Words: International trade, export promotion, promotion response, agricultural trade.

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Introduction

Attempts to examine the effectiveness of agricultural promotion programs can be traced to Apodaca and Wolf. However, these early studies examined only the effects of advertising and were limited to the domestic market. Little evidence was found to support the argument that advertising of agricultural commodities was a profitable enterprise.

Despite these negative results, farm promotion programs grew, including more commodities than before. Most economic analyses still focused on advertising, failing to capture the effects of other promotional activities, such as, trade fairs, food shows, market research and development, and public education efforts (McClelland, et al. and Hochman, et al.). None considered the effects of promotion in foreign markets and the resultant influence on farm income until Lee conducted an analysis of the impact of promotion on European demand for FCOJ (Lee, 1977). He concluded that the demand response was significant and promotion was a superior method of increasing sales compared to price reduction.

This paper analyzes the economic impact of export promotion of three important agricultural commodities: apples, poultry, and tobacco. An attempt is made to examine the total promotion program, hence analysis is not focused on advertising or any other specific promotion activity. The impact of export promotion on farm and export revenues is examined net of the

effects of income, prices, population, exchange rates, and supply factors.

Export Promotion Programs

Organized efforts to promote agricultural commodities worldwide began in 1955 under the USDA Foreign Agricultural Service (FAS) cooperator program. Since then, the program has grown to include 56 commodity organizations or cooperators, 3.3 million farmers, 1,500 cooperatives, 7,000 processors and handlers, and 1,600 foreign firms all working toward expanding U.S. exports in more than 80 countries (Meyer).

The typical farm promotion program involves three parties: the FAS, a U.S. cooperator such as Tobacco Associates or the Northwest Horticultural Council, and foreign distributors or agents. About three-fourths of all promotional expenditures are trade related, while the rest focus on consumers. Major activities include market research and development, advertising, public education, product demonstration and sampling, and food shows and trade fairs.

Promotion programs have the primary objective of increasing demand for a specific commodity or product (Waugh). Promotion of branded or packaged goods has attempted to differentiate the product from the competition thereby rendering the demand curve less elastic, allowing a higher price to be charged. Other programs, aimed at making demand more elastic, have promoted the benefits of lower price and larger supplies. However, both have the common goal of increasing the net revenue of producers.

Funding for agricultural promotion efforts is based on voluntary or mandatory contributions made by growers. While

milk, fruits and vegetables, and nut producers have received federal authorization establishing marketing orders, most other commodity groups rely on check-off provisions of state legislation to obtain funds for promotional efforts.

The cooperator program for tobacco relies on a ten cent per hundredweight mandatory check-off on all flue-cured tobacco delivered to warehouses in North and South Carolina. This program is subject to grower referendum held every three years. Funds are transferred directly to the FAS cooperator. In Florida, Georgia, and Virginia growers are taxed a greater amount, with ten cents per hundredweight paid to the cooperator for promotional purposes. Funds generated from the sale of tobacco are used by Tobacco Associates in three main programs: (1) advertising of foreign cigarettes containing a high proportion of U.S. flue-cured tobacco; (2) hosting industry and government officials from other countries to educate them regarding the production and quality of U.S. tobacco; and (3) sponsoring technical seminars in foreign countries.

Export promotion of apples is conducted through a mandatory grower assessment on each box of apples produced. Although much of the collected funds are used domestically, a substantial part pays for consumer advertising, in-store promotion, and travel in foreign markets. The assessment is maintained through grower referendum, with the FAS matching each dollar collected by the Northwest Horticultural Council.

Poultry products were promoted through the Poultry and Egg Institute until 1984 when the U.S. Poultry Export Council took responsibility for foreign market development activities.

The objective of this paper is to analyze the effectiveness of foreign market promotion programs for apples, poultry, and tobacco. Export sales response is determined for each commodity to reflect how effectively grower and government promotion funds have been used. An historical overview of promotion and exports in selected foreign regions is followed by a brief review of previous efforts to analyze promotion programs. Statistical analysis is used to derive empirical estimates of the impact of promotion expenditures on export sales.

Historical Overview

Export promotion expenditures on apples reached $435,000 in 1981, resulting in a six fold increase over the $66,000 in 1972 (Figure 1). This represented an annual compounded growth rate of 23 percent. A total of $2.0 million had been spent through 1981; the industry cooperator share of the total promotion expenditure increased from 36 percent in 1972 to 65 percent in 1981. U.S. apple exports increased from $12 million to $153 million during the same period. Actual tonnage exported increased almost four fold from 68,000 metric tons to 257,000 metric tons. Between 10 and 15 percent of total promotion expenditures were made in the European Community (EC), half in other western European countries, 25 percent in South America, and since 1976, about 20 percent in East Asia (USDA, FAS).

Poultry promotion expenditures in foreign markets have increased at about 10 percent annually, going from $951,000 in 1972 to $1.9 million in 1981. Sixty percent of this amount was provided by the industry cooperator in 1980 compared to 27 percent in 1972. Total expenditures since 1972 now stand at $14

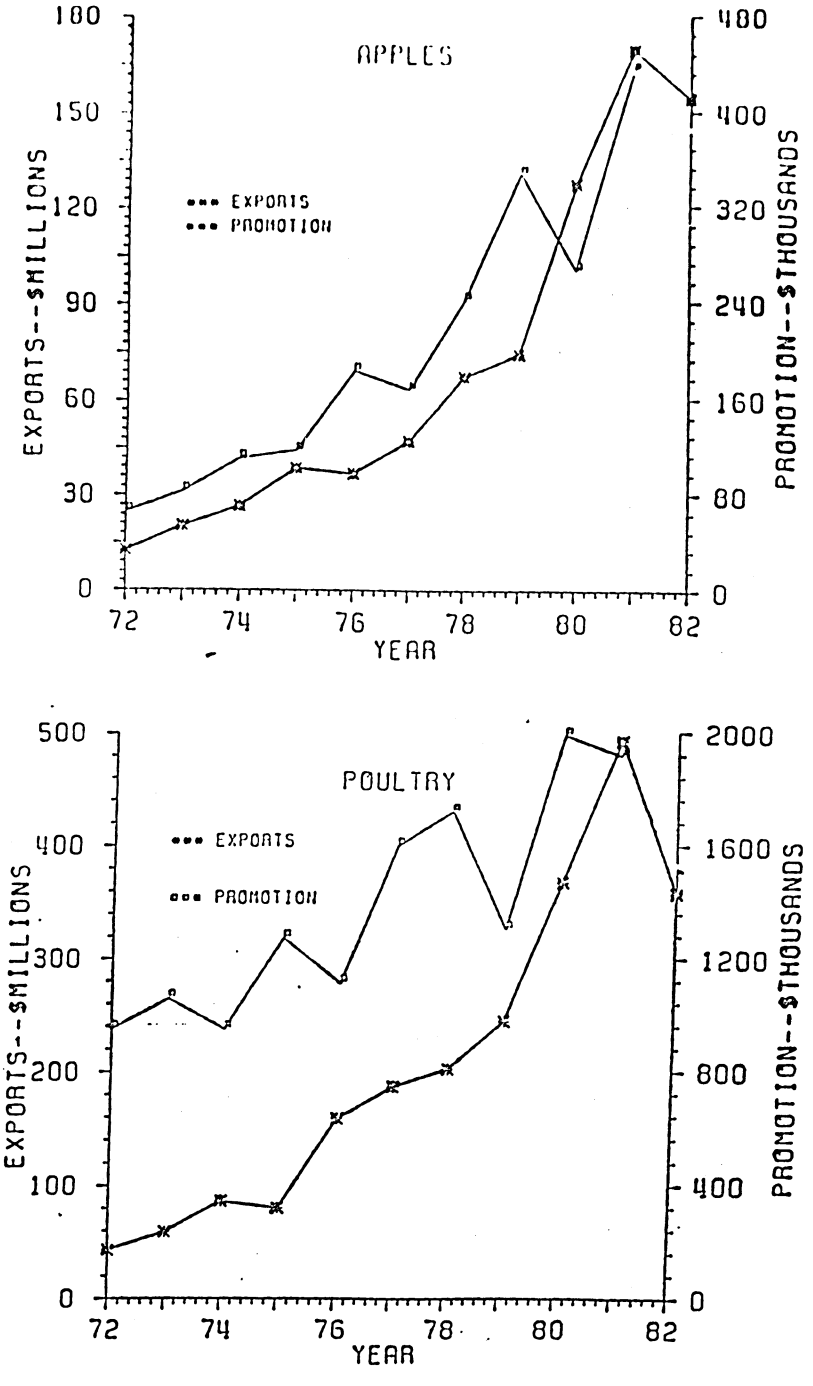

FIGURE 1. Foreign Market Promotion Expenditures and U.S. Exports of Apples, Poultry, and Unmanufactured Tobacco, FY1972-82.

SOURCE: USDA, Economic Research Service and USDA, Foreign Agricultural Service.

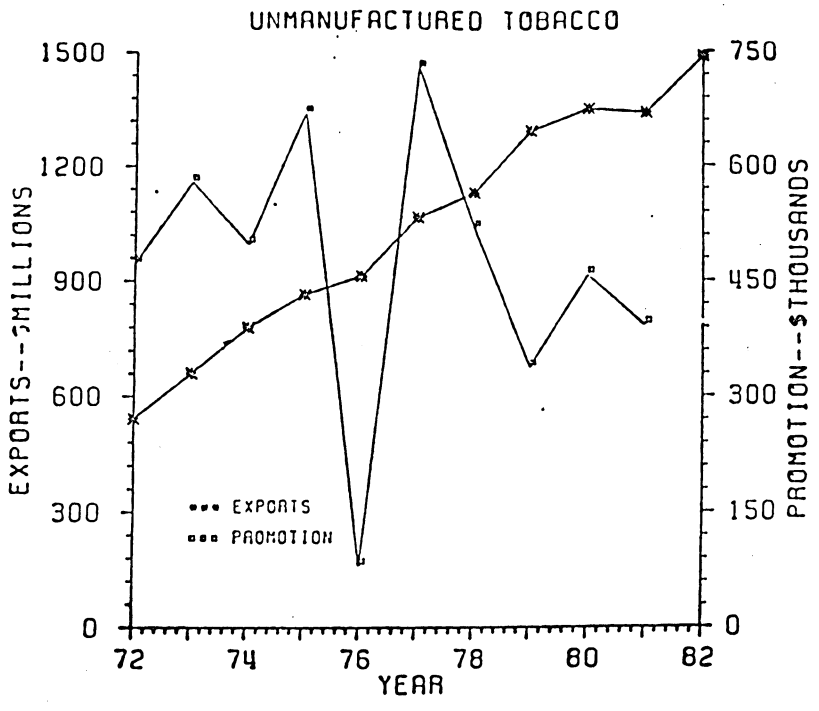

FIGURE 1. (cont.) Foreign Market Promotion Expenditures and U.S. Exports of Apples, Poultry, and Unmanufactured Tobacco, FY1972-82.

SOURCE: USDA, Economic Research Service and USDA, Foreign Agricultural Service.

million. Forty-five percent of foreign promotion expenditures were made in the EC, 50 percent in East Asia, and small amounts in other western European countries and the Mid-East. U.S. poultry exports increased from $43.4 million in 1972 to a peak of $493 million in 1981, then declined. Annual export volume reached 267,000 metric tons in 1982, 300 percent above a decade earlier.

Export promotion of unmanufactured tobacco has stayed fairly constant since 1972, averaging $473,000 annually. Promotional expenditures were sharply lower in 1976 than any other year over the period. After reaching $669,000 in 1975, only $80,000 was available the following year, while $728,000 was spent in 1977. Industry cooperator shares of total promotion expenditures have ranged from 68 percent in 1976 to 99.6 percent in 1978. Western Europe received 50 to 60 percent of promotion expenditures through 1978. Since then, the EC and East Asia have been major recipients. U.S. exports of unmanufactured tobacco have increased from $570.4 million in 1972 to $1.5 billion in 1982. Export volume expanded by only 4.7 percent to 265,000 metric tons during the same period.

Response to Investment in Promotion

Because of the large amount of capital spent on promotion programs, the decision to allocate funds among alternative enterprises becomes an important one. Producer groups, trade organizations, and foreign firms must all be involved in the decision process regarding a particular foreign market promotion effort. Therefore, questions regarding rate of return, competition, and the effect of promotion on underlying structural

factors must be considered. For foreign market development programs to be implemented effectively, it is essential to know the promotion response rate after accounting for changes in income, prices, exchange rates and other factors. Information about the economic effectiveness of export promotion is necessary to justify continued investment in such programs.

Most previous studies of commodity promotion programs have analyzed the impact of advertising on retail markets and consumer expenditures (McClelland, et al. and Hochman, et al.). Both studies examined optimal advertising expenditures in relation to consumer sales. Lee estimated the impact of advertising and price changes on processor revenue in the Florida grapefruit industry (Lee, 1981). Alternative strategies were discussed.

However, not until 1982 did research focus on the effect of a total promotion program in foreign markets (Williams, et al.). The results indicated that returns to soybean growers averaged $58 per dollar invested in export promotion. Returns were highest in the EC, $76, compared to $20 in Japan. Unlike many previous approaches, they examined export promotion effectiveness, net of changes in prices, exchange rates, income and other factors including livestock output and population growth. Promotion in new markets resulted in high initial returns per dollar invested and then declined as funding increased. This finding supports the theoretical concept of the "decay curve" discussed by Waugh. However, the authors caution that promotion criteria should consider not only dollar return, but the underlying potential of the market based on population, livestock base, and overall acceptance of the product.

The decay of promotion expenditures over time raises the question of the distribution of promotion impacts, i.e., the lag or distributed lag effect of export promotion expenditures. It seems clear that the effects of promotion in a given period will be distributed over future time periods. However, an attempt to thoroughly examine the underlying lag structure of promotion expenditures was beyond the scope of this paper. The authors were aware of the problem and attempted to compensate by testing various lags of export promotion expenditures.

Lee and Brown used an error component analysis to determine the effectiveness of orange juice advertising in Europe. Their results suggest that export promotion is a more profitable method of generating additional sales than is a price reduction. They conclude that the export of Florida orange juice would be adversely affected if the promotion program were reduced or eliminated. Results by Lee and Tilley suggest that advertising had a significant impact on market share.

Empirical Model and Results

To test the hypothesis that export promotional expenditures have had a positive impact on export sales of apples, poultry, and tobacco, a simple linear regression model was formulated. Due to the lack of an extensive set of observations over time, the model was specified as concisely as possible. It was hypothesized that export sales of commodity j from the U.S. to region i was primarily influenced by the U.S. export price of the commodity, the major competitor's price of the commodity, expenditures on promotion of U.S. export sales of the commodity, and real disposable income in the importing countries.

Preliminary testing did not reveal that income had a significant influence on sales of these commodities, so that variable was dropped from the model. Thus, the model took the form:

(1) $XS_{jt}=\beta_o+\beta_1 PRM_{jt}+\beta_2 USPR_{jt}+\beta_3 CPR_{jt}+\sum_{i=1}^{n}\beta_{3+i,t}D_{it}$

where:

XS_{jt} = Volume of U.S. exports of commodity j in year t in metric tons;

$PRM_{jt}=\sum_{i=0}^{2} w^{i+1}\cdot PREXP_{t-i}$, where $PREXP_t$ are real U.S. expenditures for export promotion in year t in thousands of dollars and $\sum_{i=1}^{3} w^{i=1}$;

$USPR_{jt}$ = U.S. export price of commodity j in year t in dollars per metric ton deflated by the agricultural trade-weighted exchange rate;

CPR_{jt} = Competitor price of commodity j in year t in dollars per metric ton deflated by the agricultural trade-weighted exchange rate;

and

D_{it} = 0-1 dummy variables for regions i.

The data used in model estimation were taken from various FAS and UN, Food and Agriculture Organization (FAO) sources for the years 1972-1981. The agricultural trade-weighted exchange rate was taken from Longmire and Morey. Data were collected on a country by country basis and then combined into regional aggregates. Competitor's prices were converted to dollars by the individual country's exchange rate, and then that price was adjusted by the trade-weighted exchange rate.

A major limitation of studies of this type, where rather detailed international data are required, is the availability and

consistency of the data. Trade volumes and prices often differed between FAS and FAO sources, and for some countries data were not available for the entire time period desired. Where conflicting information was observed, generally the FAS data were used. Thus, the models were estimated using the best available information, though not necessarily a complete set of information.

The model given by equation (1) involves time series and cross-sectional data. The possibility of problems of autocorrelation and heteroskedasticity were addressed by imposing transformations on the data as suggested by Kmenta. The model estimated was:

$$(2)\quad XS^{**}_{jt} = \gamma_0 + \gamma_1 PRM^{**}_{jt} + \gamma_2 USPR^{**}_{jt} + \gamma_3 CPR^{**}_{jt} + \sum_{i=1}^{n} \gamma_{3+i} D_{it}$$

where each starred variable in (2) is tranformed from its counterpart in (1) by assuming first order autocorrelation and heteroskedasticity and compensating for these. First, equation (1) is estimated by OLS and the results are used to calculate the first order autocorrelation coefficient $\hat{\rho}i$ for each region, according to the formula:

$$(3)\quad \hat{\rho}_i + \frac{\Sigma e_{it} \cdot e_{i,t-1}}{\Sigma e_{i,t-1}^2}, \text{ for } t = 1973, \ldots, 1982.$$

These values are used to transform each variable in the equation by:

(4) $Z^{*}_{it} = Z_{it} - \hat{\rho}_i Z_{i,t-1}$, where Z refers to the variables listed in (1), and nonautoregressive residuals are obtained as:

(5) $\hat{u}^{*}_{it} = e_{it} - \hat{\rho}_i e_{i,t-1}$.

Variables in equation (2) are obtained from (4) and (5) as :

(6) $Z^{**}_{it}=Z^{*}_{it}/S_{ui}$,

where:

(7) $S_{ui}=[(1/T-k-1)\sum_{t=1973}^{1982} Q^{*}_{it}{}^{2}]^{\frac{1}{2}}$.

This correction procedure was chosen because of its relative computational ease and because the assumption of cross-sectional independence is reasonable for the regions specified in the model.

Empirical results are presented in Table 1. Regression coefficients for the apple and tobacco equations have plausible signs. The coefficients for these equations are significant at acceptable confidence levels; however, the coefficients for the poultry equations are not. Each equation was tested using the US price and competitor price as separate variables, as one relative price variable (RELPR), and with the US price alone. For apples, results were superior when the relative price variable was employed. The fresh apple price for France was used as the competitor price. For tobacco the competitor price variable did not contribute useful information probably because of the large number of competitors in the world tobacco market, no one of whom is dominant.

For poultry, price variables gave implausible results, regardless of specification. Three poultry equations are presented in Table 1. They display a consistent pattern of results with respect to the promotion variable--positive but insignificant. Price variables consistently demonstrate a positive response. These results likely reflect the general

Table 1. Empirical Results of Regression Model

Export Sales of	Explanatory Variables				Regional Dummy Variables[a]				
	Intercept	PRM	USPR	RELPR	EC	West Europe	Mid East	East Asia	Southeast Asia
Apples	50.20 (2.37) R^2=.86	15.94 (1.42) [.51]		- .002 (3.95) [.43]	294.18 (2.17)	-51.12 (1.63)	b	-32.69 (1.09)	b
Tobacco	116.74 (12.04) R^2=.97	14.70 (6.57) [.05]	-8787.79 (2.39) [.29]		-59.50 (8.14)	190.80 (3.13)	b	a	b
Poultry	.66 (.49) R^2=.74	1.52 (.86) [.18]			6.60 (.94)	9.42 (3.89)	-.55 (.29)	-.24 (.13)	.72 (.38)
Poultry	-33.39 (3.52) R^2=.84	2.05 (.33) [.25]	2.88 (5.74)		28.88 (2.51)	14.55 (2.17)	29.63 (3.35)	34.96 (3.02)	-61.76 (4.85)
Poultry	3.34 (1.08) R^2=.79	.22 (.15) [.18]		.008 (3.10)	1.48 (.08)	-101.15 (2.95)	-2.13 (.54)	1.95 (.48)	-5.65 (.64)

Note: Values in parentheses are absolute t- statistics. Values in brackets are mean level elasticities.

[a]The base region for poultry and apples is South America. For tobacco the base region is East Asia.

[b]Trade to these regions was negligible.

trend of growth in the poultry market which overshadows particular price responses. These results also demonstrate the difficulty of associating aggregate economic variables to markets that include a variety of products under the single label of "poultry meat". Promotion response may be negligible for the aggregate, but significant for particular poultry products. Data, however, are insufficient to reveal whether or not this is true.

Mean level price elasticities for apples and tobacco are also given in Table 1. These elasticities indicate an inelastic response to changes in U.S. prices for both commodities. Price elasticities for poultry are not reported because their directions are implausible.

The elasticity for export promotion is used to calculate marginal returns to investment in promotion. Though the elasticity values appear small, when translated into terms of dollar returns the impact of promotional activities is quite important. The elasticity value was used to determine the impact of a marginal increase in export promotion expenditures on export sales. On average, over the period 1974 through 1981, a one dollar increase in promotion would result in increased returns of $60 and $31 for apples and tobacco, respectively. These results can be compared to response rates obtained from studies mentioned above on soybeans and citrus fruits. Williams, et al., found returns to soybean export promotion to average $58 per dollar. Lee and Brown estimated returns to orange juice promotion of about $6 per dollar, and Lee found returns to grapefruit juice promotion of $10 per dollar.

Conclusions

The results of this research indicate that export sales of apples and tobacco have been stimulated by promotional efforts employed over the past ten years. Returns per dollar of expenditure vary, but they are positive and they imply that promotional activities have been successful in achieving their goal of increased sales.

Results for poultry indicate that returns to promotion are not statistically significantly different from zero. Probably, these results reflect the diversity within the poultry market that cannot be ferreted out with available data. If, however, promotional efforts were geared to cover the spectrum of poultry meat products, their impact has been negligible.

FAS cooperators have assumed a greater proportion of the commodity promotion programs since 1972. Results suggest that these funds generated significant export returns for apples and tobacco. Thus, the results of this study lend further support to the growing body of literature that shows that export sales of U.S. agricultural commodities have been stimulated by promotional efforts.

Three main areas for further research are recommended. First, it seems a logical extension of this analysis is to consider the impact of specific promotional activities such as research and trade shows, etc., on export sales. Second, efforts should be made to determine whether the export demand elasticity has changed over time and if so, what implications this may have for continued promotion and long term marketing strategies. Third, it would be useful to know how demand elasticities

differed among regions and the implications for alternative pricing strategies. Data problems are a major limiting factor for studies of this type at this time; however, as data become available, more robust modeling efforts will become feasible.

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