IS LAMB PROMOTION *STILL* WORKING?

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Texas Agribusiness Market Research Center (TAMRC) Commodity Market Research Report No. CM-02-08, August 2008 by Dr. Oral Capps, Jr. and Dr. Gary W. Williams.

ABSTRACT

This objective of this study is to update last year's analysis of the effectiveness of the lamb advertising and promotion program of the American Lamb Board (ALB). The main conclusion is that the lamb checkoff program is still working effectively to increase lamb consumption and sales in the United States. The analysis shows that ALB lamb promotion programs have generated roughly 8 additional pounds of total lamb consumption per dollar spent on advertising and promotion and $44.45 in additional lamb sales per dollar spent on advertising and promotion.

ACKNOWLEDGEMENTS

The research reported here was conducted under contract with the American Lamb Board. The lamb advertising and promotion data used in this study were collected with the assistance of the American Sheep Industry Association, Inc. (ASIA) and the American Lamb Board (ALB). The conclusions reached and any views expressed, however, are those of the authors and may not represent those of ASIA, ALB, or Texas A&M University.

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EXECUTIVE SUMMARY

Last year, based on the statistical analysis of the lamb checkoff expenditure data and lamb sales data through FY 2007, we reported that the Lamb Checkoff Program was effective in stimulating demand and increasing industry revenues. Our conclusion was that since the inception of the Lamb Checkoff Program, the checkoff generated an average of roughly 7.6 additional pounds in total lamb consumption per dollar spent on advertising and promotion and $41.59 in additional lamb sales per dollar spent on advertising and promotion.

Is the Lamb Checkoff Program still working? Have the checkoff assessments paid by the industry and invested by the American Lamb Board (ALB) in lamb advertising and promotion activities continued to effectively increase lamb consumption in the United States? Have the benefits of the program in terms of increased industry revenues continued to be sufficient to outweigh the costs of the program? This report addresses these important questions through an updated statistical analysis of U.S. demand for lamb at the retail level of the marketing channel to isolate and measure the separate demand effects of the main economic determinants of that demand, including the ALB advertising and promotion program. The results of the analysis then are used to calculate an updated benefit-cost ratio (BCR) for the program.

The analysis utilizes historical data through 2007/08 and statistical procedures (regression analysis) to measure the effect of advertising and promotion on lamb consumption. All possible relevant economic factors affecting lamb consumption are considered, including: (1) the retail price of lamb; (2) the retail prices of beef, pork, and chicken; (3) disposable personal income; (4) population; (5) inflation; and (6) advertising and promotion expenditures for lamb. The analysis controls for the effects of all economic factors other than the lamb checkoff program and, thus, isolates the specific impacts of advertising and promotion on lamb. The results allow the measurement of the change in lamb consumption (and lamb sales at fixed prices) attributable to advertising and promotion dollar expenditures, holding all other factors constant.

The main conclusion from this analysis is that the Lamb Checkoff Program continues to be effective in increasing the demand for lamb at a highly positive benefit-cost ratio. Specific conclusions include the following:

- Doubling ALB lamb promotion expenditures in any given year would boost lamb consumption by 4.36%.

- The ALB lamb promotion program has resulted in roughly 8.05 additional pounds of total lamb consumption per dollar spent on advertising and promotion and $44.45 in additional lamb sales revenue per dollar spent on advertising and promotion. Even if the share of the retail sales dollar earned by lamb producers was quite low, this level of total return to

promotion nevertheless translates into a relatively high return to lamb producers from the Lamb Checkoff Program.

- Past promotion efforts over the 1978/79-2001/02 period were effective in enhancing lamb demand but less so than the recent activities of the ALB. In other words, the programmatic activities of the ALB have been relatively more successful in stimulating lamb than past promotional efforts.

- This high estimated return to lamb promotion implies that the Lamb Checkoff Program is greatly underfunded. Lamb checkoff assessment revenues and, thus, expenditures on advertising and promotion have been declining in recent years, except for the most recent fiscal year. Given the relatively high benefit-cost ratio (BCR) estimated for lamb promotion, the reduction in promotion expenditures over the last several years translates into a notable opportunity cost to the lamb industry in terms of lost industry revenues. These results also indicate that an increase in the assessment rate would generate a large return for every additional dollar of assessment paid by the industry. In other words, for every dollar in additional assessment NOT paid and spent on lamb promotion, the industry loses up to $44.45 in revenue. Research shows that increases in checkoff assessment rates and total spending on promotion are usually accompanied by reductions in the associated BCR so that an increase in the lamb checkoff assessment would be expected to result in a lower return to promotion. But with such a high estimated BCR, the industry could increase the assessment rate substantially and still expect to generate a reasonable rate of return comparable to what is earned by the beef, pork, cotton, soybean, and other similar checkoff programs. Most of the major commodity checkoff programs spend a great deal more on promotion than the lamb checkoff program and have been shown to generate about $2 to $10 per dollar of promotion.

This analysis, thus confirms that ALB program expenditures since 2002/03 have not only continued to stimulate the demand for domestic lamb, after accounting for other economic forces, but also to increase industry revenues sufficient to outweigh costs of the program. Nevertheless, it is important to continue to monitor changes in retail lamb consumption due to advertising and promotional efforts.

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LAMB ADVERTISING AND PROMOTION

The lamb checkoff assessment continues to be $0.005/pound of live lambs (ovine animals of any age) sold by producers, seedstock producers, exporters, and feeders. For lambs purchased for slaughter by first handlers, the assessment remains at $0.30/head. The collection of the assessment has allowed ALB to spent a total of nearly $9 million on lamb advertising and promotion since the inception of the checkoff program in July 2002, an average of about $1.5 million per year. On an inflation-adjusted basis, ALB expenditures in 2002/03 amounted to only $96,035 but rose to $2,433,196 in 2003/04, dropped to $1,518,235 in 2004/05, dropped again to $1,215,240 in 2005/06, dropped once more to $1,064,682 in 2006/07, and then finally rose again to $1,330,065 last year (Figure 1). Administrative costs are limited to a maximum of 10% of collections in any fiscal year so that most of the funds are used for promotional purposes. USDA has oversight responsibilities of the administration of the program. All activities funded with checkoff dollars must comply with the Act and the Order and must be approved by USDA.

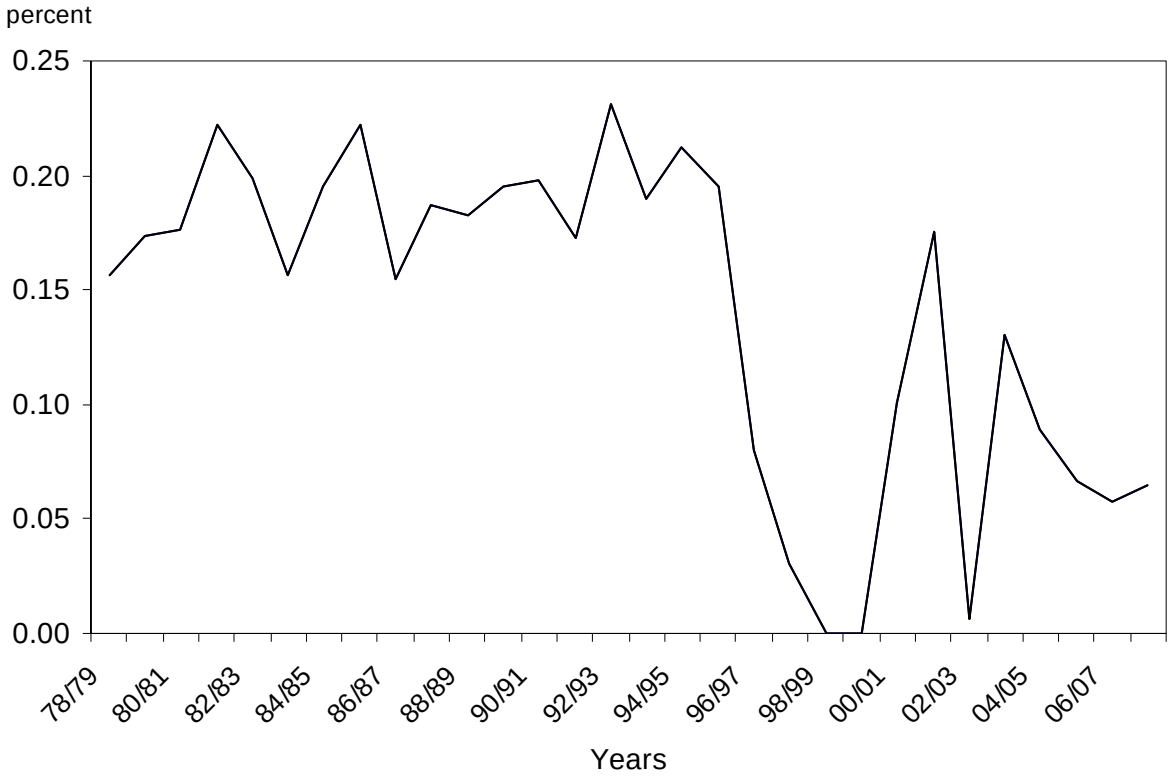
Before the current Lamb Checkoff Program was approved as a mandatory program, the American Lamb Council of the American Sheep Industry Association, Inc. (ASIA) operated a lamb promotion program using funds made available under the Wool Incentive Program. Between 1978/79 and 1996/97, inflation-adjusted annual expenditures on lamb promotion by ASIA ranged between a high as $4.2 million in 1981/82 and a low of $1.2 million in 1996/97 (Figure 1).

Figure 1: Inflation-Adjusted Advertising and Promotion Expenditures, 1978/79-2007/08

When the Wool Incentive Program and, thus, expenditures for the promotion of lamb were phased out in 1996/97, an unsuccessful effort was made that year to pass a mandatory checkoff program through a producer referendum. The only funds made available for lamb promotion after the phase-out of the Wool Incentive Program in 1995/96 and the establishment of the current Lamb Checkoff Program in 2002/03 was through a special grant resulting from a 201-trade complaint. In 1999/2000, domestic petitioners alleged injury to the U.S. lamb industry from imports. The U.S. International Trade Commission ruled in favor of the domestic complainants. As a result, a lamb import tariff and a one-time assistance package for the domestic lamb industry were established to remedy the injury and facilitate industry adjustments to import competition. Through this program, $4.8 million in section 201 relief grants for 23 lamb marketing and promotion projects were funded between 2000/2001 and 2002/2003.

Compared to the value of lamb purchases by consumers each year, the amount of funds that the lamb checkoff program collects for the promotion of lamb is extremely small. As shown in Figure 2, the lamb advertising-to-sales ratio (often referred to as the investment intensity ratio) over the 1978/79 to 2007/08 period ranged from a minimum of zero in 1999/2000 and 2000/01 to a high of 0.23% in 1992/93 and averaged 0.14% over the entire period. In other words, the amount of checkoff funds spent to promote lamb consumption each year has been no more than

Figure 2: Lamb Advertising to Sales Ratio, 1978/79-2007/08



about one quarter of 1% of the value of lamb sales in any year, much less than is the case for most of the major checkoff program commodities like beef, pork, soybeans, and milk. The lamb advertising intensity has declined since the establishment of the lamb checkoff program, primarily because less has been collected than what was formerly spent on lamb promotion by the ASIA under the Wool Incentive Program. The annual lamb sales-to-advertising ratio between 2002/03 and 2007/08 averaged 0.07% compared to 0.19% between 1978/79 and 1995/96 when the ASIA was responsible for generic lamb promotion efforts.

ALB checkoff advertising and promotion programs are aimed at expanding consumption of American lamb by: (1) getting people to ask for American lamb year-round; (2) branding American lamb as the preferred choice in the marketplace; (3) differentiating American lamb from import competitors; (4) minimizing the volatility of seasonal product sales through targeted promotions; (5) promoting the use of the whole lamb – using all cuts; and (6) leveraging and expanding ALB resources through cooperative relationships with marketing partners.

METHODOLOGY AND DATA

This study updates the 2007 Capps and Williams analysis. As in last year's analysis this study used a polynomial distributed lag (PDL) process to capture the advertising carryover effects as is

commonly done in analyses of commodity checkoff programs. In addition, a square root transformation of the advertising and promotion variable is used in the demand model to allow for both diminishing marginal returns and zero expenditures in advertising expenditures at certain time periods. The model subsequently is re-estimated after adding one additional year of data to the dataset to create a 1978/79 through 2007/08 sample period.

The analysis utilizes annual historical data for fiscal years 1978/79 through 2007/08 and statistical procedures (regression analysis) to measure the effect of advertising and promotion on per capita lamb consumption. To accomplish this task, we consider all possible relevant economic factors affecting lamb consumption (C), including: (1) the retail price of lamb (P); (2) the retail prices of beef, pork, and chicken (P_i); (3) personal disposable income (Y); (4) population (POP); (5) inflation (I); and (6) advertising and promotion expenditures for lamb (E).

The general form of the econometric equation used in this analysis is expressed as:

(1) $C_t/POP_t = f(P_t/I_t, P_{it}/I_t, Y_t/POP_t/I_t, E_t/I_t,)$

where t = the current year; i = beef, pork, and chicken; Y = personal disposable income; I = consumer price index; and E = the square root transformation of ALB promotion expenditures.

Data for per capita lamb consumption (C/POP) are available from USDA (2007) while retail prices (P and P_i) are from the Livestock Marketing Information Center (LMIC) and the Bureau of Labor Statistics (BLS). Data for personal disposable income (Y), population (POP), and inflation (I) are provided by the Federal Reserve Bank (FRB). Data for inflation-adjusted lamb advertising and promotion expenditures by the American Lamb Board are available only since July 2002. To insure a sufficient sample size for regression analysis, fiscal year data on advertising expenditures by American Lamb Board since July 2002 are combined with lamb promotion expenditures by the American Sheep Industry Association (ASIA) under the Wool Incentive Program before the implementation of the lamb checkoff program[1]. In the analysis, care is taken to delineate the effects of the advertising and promotion expenditures of the American Lamb Board since July 2002 from previous promotional expenditures made from 1978/79 through 2001/02. Obviously, the more relevant advertising effects for this analysis are those of the current Lamb Checkoff Program.

The objective of the regression analysis is to control for the effects of all economic factors other than the lamb checkoff program and, thus, isolate the specific impacts of advertising and promotion on lamb. The statistical regression technique used allows a measurement of the change in lamb consumption at fixed prices attributable to prices, income, and advertising and promotion dollar expenditures, holding all other factors constant. These measurements are the own-price, cross-price, income, and advertising elasticities associated with the demand for lamb mentioned earlier. Specifically, the elasticities estimated are the percentage changes in the per capita consumption of lamb due to unit percentage changes in inflation-adjusted lamb price, the inflation-adjusted prices of other meats (beef, pork, and chicken), the inflation-adjusted per capita income, and inflation-adjusted advertising and promotion expenditures.

[1] Data for ASIA promotion expenditures for 1978/79 through 2001/02 were provided by Tom McDonnell of the American Sheep Industry Association.

STATISTICAL RESULTS

The structure of the model used in this analysis is the same as used for last year's analysis. Diminishing marginal returns to advertising normally observed in checkoff promotion programs is accounted for in the model with the use of a square root transformation of the advertising and promotion expenditures variable. To capture the carryover effects of advertising and promotion, a second degree polynomial of lag length of one year with endpoint constraints was used. The degree of the polynomial and the number of lags were determined through the use of the Akaike Information Criterion (AIC) and the Schwarz Information Criterion (SIC), commonly accepted statistical measures of model selection. The rationale for the consideration of lags in advertising is that its impact may not be felt all at once. The impact of advertising and promotion likely is distributed over time.

The estimated model explains roughly 80% of the variability in per capita lamb consumption over the 1978/79-2007/08 period of analysis (Table 2). The parameter estimates indicate that the ALB checkoff program has had a statistically significant effect on per capita lamb consumption. Other statistically significant economic drivers of U.S. lamb consumption were found to be the price of lamb and the prices of beef and pork. Neither income nor the price of chicken was found to have a statistically significant effect on lamb consumption.

The estimated own-price elasticity of lamb is -0.65 meaning that for every 10% change in the inflation-adjusted lamb price, per capita lamb consumption changes by 6.5% in the opposite direction. Thus, the per capita demand for lamb is price inelastic (that is, not overly sensitive to price).

Cross-price elasticities for beef and pork are estimated to be 0.63 and 0.34, respectively, meaning that a 10% increase in beef price leads to a 6.3% increase in per capita lamb consumption and a 10% increase in pork price leads to a 3.4% increase in per capita lamb consumption, holding all other factors constant. The positive cross-price elasticities for beef and pork lead to the conclusion that beef and pork are substitute meat products for lamb. The own-price, cross-price, and income elasticities are consistent with the results of previous research. The income elasticity is estimated at 0.31 but is not statistically different from zero.

This analysis constitutes the fourth updated estimate of the parameters of this lamb demand model with each update adding more recent data to the dataset. Notably, the own-price and cross-price elasticities have been quite stable. In the updating process, the own-price elasticity of demand has decreased slightly, the cross-price elasticity for beef has risen slightly, and the cross-price elasticity for pork has declined slightly. Although not statistically different from zero in this update or previous updates, the estimated income elasticity has risen monotonically from 0.11 with data through 2004/05 up to 0.31 with data through 2007/08. This rise in the income elasticity may be the result of the growing importance of the food away from home sector to the lamb industry over time.

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Table 2: The Lamb Demand Model[a]

$$LN(PCLC) = -4.436 - 0.659*LN(RPL/CPI99) + 0.634*LN(RPB/CPI99) + 0.343*LN(RPP/CPI99) + 0.308*LN(PCDI/CPI99) + 0.00091*(SRLADV_t) + 0.00091*(SRLADV_{t-1})$$

(4.186) (0.175) (0.248) (0.217) (0.315) (0.00054) (0.00054)

$R^2 = 0.804$ R^2 (adjusted) = 0.762 DW = 1.369

where	PCLC	=	per capita lamb consumption (pounds)
	RPL	=	retail price of lamb ($/lb)
	RPB	=	retail price of beef ($/lb)
	RPP	=	retail price of pork ($/lb)
	PCDI	=	per capita disposable income ($)
	CPI99	=	consumer price index (1999=100)
	SRLADV	=	square root of real lamb advertising and promotion expenditures ($ thousands)

[a] Numbers in parentheses are standard errors.

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The lamb promotion expenditure elasticity is estimated to be 0.0436 which is consistent with those of other checkoff commodities. In other words, the statistical results indicate that a doubling of lamb promotion expenditures (that is, a 100% increase) would result in a 4.36% increase in per capita lamb consumption. Using the same model with data for only the 1978/79 to 2001/02 period prior to the existence of the American Lamb Board, the advertising and promotion elasticity was estimated to be 0.0386.

BENEFIT-COST ANALYSIS

Another way to look at the estimated relationship between per capita consumption of lamb and promotion expenditures is to use the statistical results to calculate the benefit-cost ratio (BCR) of the Lamb Promotion Checkoff Program by dividing the benefit of the promotion in terms of additional quantities sold or dollars of revenue earned per dollar spent on promotion. The first step is to use the estimated promotion elasticity to calculate the change in U.S. lamb consumption (C) effected by the Lamb Checkoff Program in any given year as:

$$(2) \qquad C_t^A - C_t^Z = [e\, PER_t^A]POP_t$$

where t refers to the current year, C^A = actual lamb consumption; C^Z = level of lamb consumption that would have occurred with no promotion expenditures; PER^A = actual per capita consumption; POP = population; and e = estimated promotion elasticity.

Then, using the results of equation (1), the Lamb Sales BCR (the additional lamb sold per dollar of promotion) is calculated as:

$$(3) \qquad \text{Lamb Sales BCR} = \frac{\sum_{t=1}^{T}(C_t^A - C_t^Z)}{\sum_{t=1}^{T} E_t}$$

where E_t = annual expenditure on lamb promotion by the ALB.

The Revenue BCR (the additional revenues generated per dollar spent on promotion) is then calculated as:

$$(4) \qquad \text{Revenue BCR} = \frac{\sum_{t=1}^{T} P_t^A (C_t^A - C_t^Z)}{\sum_{t=1}^{T} E_t}$$

where P^A = the actual retail price of lamb.

Using these formulas, the Lamb Sales BCR is calculated to be 8.05, meaning that since ALB began promoting lamb in 2002/03 through 2007/08, the ALB advertising and promotion program has generated roughly 8.05 additional pounds of total lamb consumption for every dollar spent on advertising and promotion. According to equation (4), that translates into additional lamb sales revenue of $44.45 for every dollar spent on promotion.

The analysis also shows that lamb promotion efforts prior to the establishment of ALB (1978/79 through 2001/02) were also effective in enhancing lamb demand but less so than the more recent

promotional activities of the ALB. Over the pre-ALB period of 1978/79-2001/02, advertising and promotion efforts translated into 5.75 additional pounds of total lamb consumption per dollar spent on promotion and $27.21 in additional lamb sales per dollar spent. Consequently, the programmatic activities of the ALB have been relatively more successful in stimulating lamb than past promotional efforts.

Note that the benefits are calculated at the retail level. An important question is how much of the increased retail-level revenues generated actually reaches lamb producers. For many checkoff programs, the portion of the revenues generated that accrue to producers is estimated using USDA estimates of the share of the retail dollar that is earned by farmers. Unfortunately, however, the USDA does not calculate that share for lamb. For beef, USDA calculates the farmers' share of the retail dollar spent on beef was about 46.2% on average between 2001 and 2006 (USDA 2006). For pork, the estimated share was lower at 28.9% over the same period. If lamb producers earned the same share of the retail dollar as beef producers, then the revenue BCR from the lamb promotion program at the producer level would be $20.53. If lamb producers earned the same share of the retail dollar as pork producers, then the lamb revenue BCR at the producer level would be $12.84. Even if the share earned by lamb producers was much lower, even at 10% for example, lamb producers would still be earning $4.44 for every dollar invested in the Lamb Checkoff Program, a reasonable return on investment.

These BCRs reflect a relatively high return to the investment made by the lamb industry in promoting lamb demand. The calculated BCRs provide solid, statistical evidence that ALB lamb promotion efforts have been and continue to be effective in building demand for lamb. They also imply that the lamb promotion program continues to be heavily under-funded, a conclusion that is consistent with the experience of other commodity checkoff organizations. In other words, while an increase in the assessment would result in more funds for promoting lamb, the greater the increase, the lower the calculated BCR would likely be given the diminishing effectiveness of each additional dollar of promotion that is normally experienced by agricultural producer organizations. However, with such a sizeable BCR, the lamb checkoff assessment could be increased substantially and still realize a healthy return. In fact, however, nominal ALB advertising and promotion expenditures have dropped steadily from $2.72 million in 2003/04 to $1.75 million in 2004/05 to $1.45 million in 2005/06 to $1.30 million in 2006/07. However, in 2007/08, nominal ALB advertising and promotion expenditures rose to $1.64 million. Nevertheless, the calculated BCR for lamb suggests a notable opportunity cost in terms of lost revenue to the lamb industry over the last few years from every dollar of reduced checkoff revenues.

CONCLUSIONS

The main conclusion from this analysis is that the Lamb Checkoff Program is working to increase the demand for lamb. Specific conclusions include the following:

- Doubling ALB lamb promotion expenditures in any given year would boost lamb consumption by 4.36%.

- The ALB lamb promotion program has resulted in roughly 8.05 additional pounds of total lamb consumption per dollar spent on advertising and promotion and $44.45 in additional lamb sales revenue per dollar spent on advertising and promotion. Even if the share of the retail sales dollar earned by lamb producers was quite low, this level of total return to promotion nevertheless translates into a relatively high return to lamb producers from the Lamb Checkoff Program.

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