

**HAS THE AMERICAN LAMB BOARD
INCREASED THE DEMAND FOR LAMB?**

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Texas Agribusiness Market Research Center (TAMRC) Commodity Market Research Report No. CM-01-05 by Dr. Oral Capps, Jr. and Dr. Gary W. Williams.

ABSTRACT

This report updates a previous tentative analysis of the effectiveness of the Lamb Checkoff Program in shifting out the demand for American lamb. The main conclusion is that program has resulted in roughly 8.4 additional pounds of total lamb consumption per dollar spent on advertising and promotion and \$44.60 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.

The Texas Agricultural Market Research Center (TAMRC) has been providing timely, unique, and professional research on a wide range of issues relating to agricultural markets and commodities of importance to Texas and the nation for over thirty-five years. TAMRC is a market research service of the Texas Agricultural Experiment Station and the Texas Agricultural Extension Service. The main TAMRC objective is to conduct research leading to expanded and more efficient markets for Texas and U.S. agricultural products. Major TAMRC research divisions include International Market Research, Consumer and Product Market Research, Commodity Market Research, Information Systems Research, and Contemporary Market Issues Research.

HAS THE AMERICAN LAMB BOARD INCREASED THE DEMAND FOR LAMB?

EXECUTIVE SUMMARY

This report updates a previous tentative analysis of the effectiveness of the Lamb Promotion, Research, and Information Order, better known as the American Lamb Checkoff Program, in shifting out the demand for American lamb. The Lamb Checkoff Program is designed to expand market share 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 competitors with the “10,000 Miles Fresher” and the “American Lamb from American Land” advertising campaigns; (4) minimizing the volatility of seasonal product sales through targeted promotions; (5) promoting to encourage use of the whole lamb – using all cuts; and (6) leveraging and expanding ALB resources via cooperative relationships with marketing partners.

The overall objective of this analysis is to determine through nonpartisan statistical analysis the impact of the advertising and promotion dollars spent by the ALB on lamb consumption at the retail level of the marketing channel. The objective of this specific report is to replicate an analysis done late in 2004 using more recent data to determine the current status of the effectiveness of the ALB advertising efforts.

The analysis utilizes historical data 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) personal disposable income; (4) population; (5) inflation; and (6) advertising and promotion expenditures for lamb. 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 results allow a 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 conclusions from the updated analysis are the following:

- Doubling ALB lamb promotion expenditures in any given year would boost national lamb consumption by 3.12%.
- The ALB lamb promotion program has resulted in roughly 8.4 additional pounds of total lamb consumption per dollar spent on advertising and promotion and \$44.60 in additional lamb sales per dollar spent on advertising and promotion.
 - These figures are slightly lower than those from the preliminary analysis which concluded that ALB promotional efforts had created roughly 10.1 additional pounds of total lamb consumption per dollar spent and roughly \$50.70 in additional lamb sales per dollar spent.

- The slightly lower returns to ALB lamb promotion expenditures in the updated analysis is consistent with both theory and the experience of other commodity checkoff organizations that the relatively high marginal returns to ALB promotion will tend to diminish somewhat over time as the program matures.
- 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.
 - Over the 1978/79-2001/02 period before the establishment of the American Lamb Board and the lamb checkoff program, advertising and promotion efforts translated into 2.9 additional pounds of total lamb consumption per dollar spent and \$13.90 in additional lamb sales.

The updated analysis thus confirms that ALB program expenditures since 2002/03 have successfully increased the demand for domestic lamb, after accounting for other economic forces. Nevertheless, changes in retail lamb consumption due to promotional efforts must continue to be monitored. In the next phase of this project, the expenditure database will be updated and the analysis will be updated. In the updated analysis, however, a quarterly demand model for lamb will be used as opposed to the annual model now used as soon as a sufficient historical series of quarterly data on ALB lamb promotion expenditures is available. The quarterly demand model will allow the analysis to focus specifically on the ALB advertising and promotion expenditures made since July 2002 without concern for earlier advertising and promotion efforts.

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HAS THE AMERICAN LAMB BOARD INCREASED THE DEMAND FOR LAMB?

Introduction

This report updates a previous tentative analysis of the effectiveness of the Lamb Promotion, Research, and Information Order, better known as the American Lamb Checkoff Program, in shifting out the demand for American lamb. The Order was established under the Commodity Promotion, Research and Information Act of 1996 following calls by virtually all segments of the domestic sheep and lamb industry for the establishment of a checkoff program to enhance demand. Initiated on July 1, 2002, the collection of assessments provides an annual operating budget of approximately \$2.3 million. The 13-member American Lamb Board (ALB) that administers the checkoff program includes six producers, three packers or first handlers, three feeders and one seedstock producer, all appointed by the U.S. Secretary of Agriculture. The Board meets at least three times per year to establish goals and budgets for new programs and to evaluate the success of work completed. Board policies are implemented by a three-member staff in Denver, Colorado. 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.

The Lamb Checkoff Program is designed to expand market share 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 competitors with the “10,000 Miles Fresher” and the “American Lamb from American Land” advertising campaigns; (4) minimizing the volatility of seasonal product sales through targeted promotions; (5) promoting to encourage use of the whole lamb – using all cuts; and (6) leveraging and expanding ALB resources via cooperative relationships with marketing partners.

The overall objective of this analysis is to determine through nonpartisan statistical analysis the impact of the advertising and promotion dollars spent by the ALB on lamb consumption at the retail level of the marketing channel. The objective of this specific report is to replicate an analysis done late in 2004 using more recent data to determine the current status of the effectiveness of the ALB advertising efforts.

Methodology and Data

This analysis utilizes historical data and statistical procedures (regression analysis) to measure the effect of advertising and promotion on lamb consumption. To accomplish this task, we consider all possible relevant *economic* factors affecting lamb consumption, including: (1) the retail price of lamb; (2) the retail prices of beef, pork, and chicken; (3) personal disposable income; (4) population; (5) inflation; and (6) advertising and promotion expenditures for lamb. 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 results allow a 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 specific econometric models used for the analysis are provided in the Appendix.

The statistical regression technique used allows the derivation of the own-price, cross-price, income, and advertising elasticities associated with the demand for lamb. The concept of elasticity refers to the percentage change in the per capita consumption of lamb due to a 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 the inflation-adjusted advertising and promotion expenditures.

Quarterly data for per capita lamb consumption and inflation-adjusted retail prices and per capita income are available for fiscal years 1978/79 through 2004/05. The fiscal year (FY) begins in July and ends in June but quarterly 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 for American Lamb Board since July 2002 are combined with lamb promotion expenditures by the American Sheep Industry Association (ASIA, Inc.) under the Wool Incentive Program before the implementation of the lamb checkoff program. Care must be taken, however, 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 are those of the current program. In subsequent updates of this analysis, a sufficient number of quarterly observations may be available so that the analysis can focus exclusively on the ALB promotion program since July 2002.

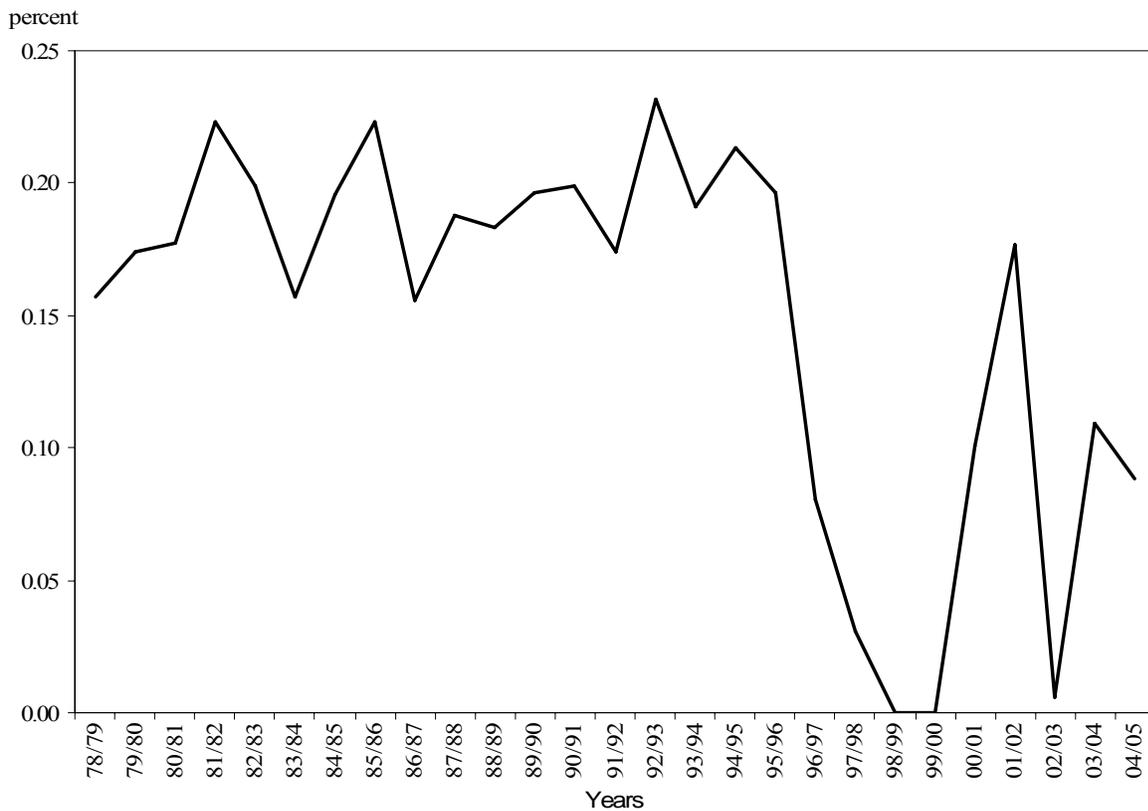
Figure 1 displays the inflation-adjusted (real) expenditures for lamb advertising and promotion over the fiscal year 1978/79 through 2004/05 period. The American Lamb Board expenditures began in 2002/03 and in real terms amounted to only \$96,035 (adjusted for inflation). ALB inflation-adjusted expenditures rose to \$2,038,340 in 2003/04 and then dropped to \$1,518,235 in 2004/05. Since the inception of the ALB checkoff program in July 2002, annual advertising and promotion expenditures have averaged about \$1.2 million per year. Prior to the establishment of the ALB, promotion annual inflation-adjusted expenditures on lamb promotion by the American Sheep Industry Association, Inc. ranged from \$0 to \$4.2 million.

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

Figure 1: Inflation-Adjusted Advertising and Promotion Expenditures, 1978/79-2004/05



Figure 2: Lamb Advertising to Sales Ratio, 1978/79-2004/05



intensity ratio) over the 1978/79 to 2004/05 ranged from a minimum of zero in 1999/2000 and 2000/2001 to a high of 0.23% in 1992/93 and averaged 0.15% over the entire period. In other words, the amount of checkoff funds spent to promote lamb consumption over the years has been no more than about one quarter of 1% of the value of lamb sales in any year.

The advertising intensity has declined since the establishment of the lamb checkoff program primarily because the checkoff program collects less than formerly spent on lamb promotion by the ASIA, Inc. under the Wool Incentive Program. The annual lamb sales-to-advertising ratio between 2002/03 and 2004/05 averaged 0.000678 (0.068%) compared to 0.0019 (0.19%) between 1978/79 and 1995/96 when the ASIA, Inc. was responsible for generic lamb promotion efforts. The Wool Incentive Program, and thus expenditures for the promotion of lamb, were phased out in 1996/97 and an effort that year to pass a mandatory checkoff program failed. 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 was 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. For most checkoff program commodities, annual advertising expenditures as a percent of producer cash receipts (industry revenues) have averaged less than 1% over time.

Results

The lamb demand model explains roughly 85% of the variability in per capita lamb consumption over the 1978/79-2004/05 period of analysis. Significant economic influences on lamb consumption include lamb price; beef and pork prices; and advertising and promotion expenditures. Neither income nor broiler (chicken) prices was a key driver of lamb consumption.

The estimated own-price elasticity of lamb was about -0.80 meaning that for every 10% change in the inflation-adjusted lamb price, lamb consumption changes by 8% in the opposite direction. Thus, the demand for lamb is inelastic (relatively unresponsive to price). In previous preliminary work based on one year less of data presented to the ALB in January 2005, the own-price elasticity of lamb was estimated to be -0.77. Hence, the addition of another annual observation did not affect appreciably the magnitude of the own-price elasticity for lamb.

Cross-price elasticities for beef and pork were estimated to be 0.53 and 0.39, meaning that a 10% increase in beef price leads to a 5.3% increase in lamb consumption and a 10% increase in pork price leads to a 3.9% increase in lamb consumption, holding all other factors constant. The positive cross-price elasticities for beef and pork leads to a conclusion that beef and pork are substitute meat products for lamb. In the previous preliminary work, the estimated cross-price elasticities for beef and pork were 0.58 and 0.39, respectively. Again, the addition of another annual observation did not affect appreciably the magnitude of these cross-price elasticities.

In the demand model, the ALB advertising and promotion variable was a moving average of current, one-period lag, and two-period lag inflation-adjusted expenditures. This moving average allows the model to capture carryover effects of advertising. In the previous preliminary analysis, the advertising and promotion elasticities (the estimated responsiveness of lamb demand to changes in promotion and advertising expenditures) were reported to be 0.022 between 1978/79 and 2001/02 and 0.031 between 2002/03 and 2004/05. In other words, based on one year less of data, the analysis concluded that each promotion dollar spent by the ALB had about a 40% larger impact on lamb demand than was the case during the 1978/79-2001/02 period.

The lamb promotion expenditure elasticities estimated using the updated database which includes data through 2004/05 are nearly identical to those reported from the preliminary analysis (0.022 for 1978/79-2001/02 and 0.031 for 2002/03-2004/05). As with the estimated price elasticities, the addition of another annual observation did not affect appreciably the magnitude of the advertising and promotion elasticity of lamb.

Conclusions

The main conclusions from the updated analysis are the following:

- Doubling ALB lamb promotion expenditures in any given year would boost lamb consumption by 3.12%.
- The ALB lamb promotion program has resulted in roughly 8.4 additional pounds of total lamb consumption per dollar spent on advertising and promotion and \$44.60 in additional lamb sales per dollar spent on advertising and promotion. These figures are slightly lower than those from the preliminary analysis, which concluded that ALB promotional efforts had created roughly 10.1 additional pounds of total lamb consumption per dollar spent and roughly \$50.70 in additional lamb sales per dollar spent. The slightly lower returns to ALB lamb promotion expenditures in the updated analysis is consistent with both theory and the experience of other commodity checkoff organizations that the relatively high marginal returns to ALB promotion will tend to diminish somewhat over time as the program matures.
- 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. Over the 1978/79-2001/02 period before the establishment of the American Lamb Board and the lamb checkoff program, advertising and promotion efforts translated into 2.9 additional pounds of total lamb consumption per dollar spent and \$13.90 in additional lamb sales. Consequently, the programmatic activities of the ALB have been relatively more successful in stimulating lamb than past promotional efforts.

The updated analysis, thus, confirms that ALB program expenditures since 2002/03 have successfully increased the demand for domestic lamb, after accounting for other economic forces. Nevertheless, it is important to continue to monitor changes in retail lamb consumption

due to promotional efforts. In this vein, we plan to continue to update our database and our analysis on a quarterly basis. As previously mentioned, we plan to move to a quarterly demand model for lamb as opposed to an annual model as soon as sufficient data are available. The quarterly demand model will allow us to more appropriately focus only on the ALB advertising and promotion expenditures made since July 2002.

APPENDIX

ESTIMATED LAMB DEMAND EQUATIONS

The following are the estimated lamb demand equations used in the analysis using the E-Views software:

Equation 1: Dependent Variable: LOG(PCLAMBCONS)

Method: Least Squares

Sample (adjusted): 1981 2005 (25 observations)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.718374	4.188665	-0.648984	0.5241
LOG(RRETLAMBPRICE)	-0.664399	0.188152	-3.531187	0.0022
LOG(RRETBEFPRICE)	0.616081	0.234178	2.630827	0.0165
LOG(RRETPORKPRICE)	0.374455	0.208503	1.795919	0.0884
LOG(RPCDSPI)	0.119847	0.309663	0.387023	0.7030
LOG(RMAACTLAMBEXPL2)	0.028745	0.020580	1.396698	0.1786
R-squared	0.837450	Mean dependent var		0.253279
Adjusted R-squared	0.794674	S.D. dependent var		0.124490
S.E. of regression	0.056410	Akaike info criterion		-2.706782
Sum squared resid	0.060459	Schwarz criterion		-2.414251
Log likelihood	39.83477	F-statistic		19.57741
Durbin-Watson stat	1.647326	Prob(F-statistic)		0.000001

where

PCLAMBCONS = Per capita lamb consumption

RRETLAMBPRICE = Real retail price of lamb

RRETBEFPRICE = Real retail price of beef

RRETPORKPRICE = Real retail price of pork

RPCDSPI = Real personal disposable income

RMAACTLAMBEXPL2 = Three year moving average of real lamb promotion expenditures (current period and two lags)

Equation 2: Dependent Variable: LOG(PCLAMBCONS)

Method: Least Squares

Sample (adjusted): 1981 2005 (25 observations)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.759560	5.274545	0.144005	0.8871
LOG(RRETLAMBPRICE)	-0.806618	0.229201	-3.519265	0.0024
LOG(RRETBEFFPRICE)	0.532996	0.245618	2.170022	0.0436
LOG(RRETPORKPRICE)	0.388886	0.208060	1.869109	0.0780
LOG(RPCDSPI)	-0.095993	0.367737	-0.261036	0.7970
LOG(RMAACTLAMBEXPL2)	0.022172	0.021383	1.036913	0.3135
ALBDUMVAR*LOG(RMAACTLAMBEXPL2)	0.009029	0.008381	1.077276	0.2956
R-squared	0.847295	Mean dependent var		0.253279
Adjusted R-squared	0.796394	S.D. dependent var		0.124490
S.E. of regression	0.056173	Akaike info criterion		-2.689262
Sum squared resid	0.056797	Schwarz criterion		-2.347977
Log likelihood	40.61578	F-statistic		16.64576
Durbin-Watson stat	1.883483	Prob(F-statistic)		0.000002

where

ALBDUMVAR = dummy variable for the ALB program where ALBDUMVAR = 1 for the years of 2002/03 to 2004/05 and 0 in other years.

Equation 3: Dependent Variable: LOG(PCLAMBCONS)

Method: Least Squares

Sample (adjusted): 1981 2004 (24 observations)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.947492	4.674692	-0.844439	0.4095
LOG(RRETLAMBPRICE)	-0.622210	0.202370	-3.074617	0.0065
LOG(RRETBEFFPRICE)	0.657699	0.246785	2.665072	0.0158
LOG(RRETPORKPRICE)	0.371402	0.211907	1.752664	0.0967
LOG(RPCDSPI)	0.194098	0.335625	0.578317	0.5702
LOG(RMAACTLAMBEXPL2)	0.029304	0.020930	1.400138	0.1785
R-squared	0.819930	Mean dependent var		0.261800
Adjusted R-squared	0.769911	S.D. dependent var		0.119489
S.E. of regression	0.057316	Akaike info criterion		-2.668155
Sum squared resid	0.059132	Schwarz criterion		-2.373641
Log likelihood	38.01786	F-statistic		16.39223
Durbin-Watson stat	1.576252	Prob(F-statistic)		0.000004

Equation 4: Dependent Variable: LOG(PCLAMBCONS)

Method: Least Squares

Sample (adjusted): 1981 2004 (24 observations)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.425757	5.542423	-0.076818	0.9397
LOG(RRETLAMBPRICE)	-0.768088	0.236858	-3.242825	0.0048
LOG(RRETBEFFPRICE)	0.576405	0.254399	2.265755	0.0368
LOG(RRETPORKPRICE)	0.386489	0.210349	1.837369	0.0837
LOG(RPCDSPI)	-0.024930	0.382646	-0.065151	0.9488
LOG(RMAACTLAMBEXPL2)	0.022241	0.021616	1.028906	0.3179
ALBDUMVAR*LOG(RMAACTLAMBEXPL2)	0.009881	0.008542	1.156775	0.2634
R-squared	0.833070	Mean dependent var		0.261800
Adjusted R-squared	0.774153	S.D. dependent var		0.119489
S.E. of regression	0.056785	Akaike info criterion		-2.660590
Sum squared resid	0.054817	Schwarz criterion		-2.316991
Log likelihood	38.92709	F-statistic		14.13982
Durbin-Watson stat	1.859721	Prob(F-statistic)		0.000009

Equation 5: Dependent Variable: LOG(PCLAMBCONS)

Method: Least Squares

Sample (adjusted): 1981 2003 (23 observations)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.115694	5.877110	-0.019685	0.9845
LOG(RRETLAMBPRICE)	-0.721023	0.221776	-3.251140	0.0047
LOG(RRETBEFFPRICE)	0.509922	0.282049	1.807920	0.0883
LOG(RRETPORKPRICE)	0.395851	0.212313	1.864466	0.0796
LOG(RPCDSPI)	-0.053775	0.406904	-0.132156	0.8964
LOG(RMAACTLAMBEXPL2)	0.025548	0.021142	1.208383	0.2434
R-squared	0.827022	Mean dependent var		0.265619
Adjusted R-squared	0.776146	S.D. dependent var		0.120667
S.E. of regression	0.057092	Akaike info criterion		-2.668865
Sum squared resid	0.055410	Schwarz criterion		-2.372649
Log likelihood	36.69194	F-statistic		16.25569
Durbin-Watson stat	1.624705	Prob(F-statistic)		0.000006

Equation 6: Dependent Variable: LOG(PCLAMBCONS)

Method: Least Squares

Sample (adjusted): 1981 2003 (23 observations)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.254293	6.205977	0.202110	0.8424
LOG(RRETLAMBPRICE)	-0.797379	0.245197	-3.251997	0.0050
LOG(RRETBEFFPRICE)	0.497715	0.285878	1.741002	0.1009
LOG(RRETPORKPRICE)	0.399090	0.214909	1.857024	0.0818
LOG(RPCDSPI)	-0.135849	0.425253	-0.319455	0.7535
LOG(RMAACTLAMBEXPL2)	0.021514	0.022023	0.976903	0.3432
ALBDUMVAR*LOG(RMAACTLAMBEXPL2)	0.007363	0.009520	0.773427	0.4505
R-squared	0.833256	Mean dependent var		0.265619
Adjusted R-squared	0.770727	S.D. dependent var		0.120667
S.E. of regression	0.057778	Akaike info criterion		-2.618613
Sum squared resid	0.053414	Schwarz criterion		-2.273028
Log likelihood	37.11405	F-statistic		13.32592
Durbin-Watson stat	1.792878	Prob(F-statistic)		0.000020

Equation 7: Dependent Variable: LOG(PCLAMBCONS)

Method: Least Squares

Sample (adjusted): 1981 2002 (22 observations)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.254293	6.205977	0.202110	0.8424
LOG(RRETLAMBPRICE)	-0.797379	0.245197	-3.251997	0.0050
LOG(RRETBEFFPRICE)	0.497715	0.285878	1.741002	0.1009
LOG(RRETPORKPRICE)	0.399090	0.214909	1.857024	0.0818
LOG(RPCDSPI)	-0.135849	0.425253	-0.319455	0.7535
LOG(RMAACTLAMBEXPL2)	0.021514	0.022023	0.976903	0.3432
R-squared	0.819601	Mean dependent var		0.272541
Adjusted R-squared	0.763227	S.D. dependent var		0.118741
S.E. of regression	0.057778	Akaike info criterion		-2.637402
Sum squared resid	0.053414	Schwarz criterion		-2.339845
Log likelihood	35.01143	F-statistic		14.53849
Durbin-Watson stat	1.679641	Prob(F-statistic)		0.000018