RAISIN ADMINISTRATIVE COMMITTEE

An Econometric Analysis Of California Raisin Export Promotion

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Executive Summary

The Raisin Administrative Committee (RAC) uses a variety of programs to stimulate sales of California raisins to export destinations, including: (1) Market Access Program, (2) MIP (Merchandise Incentive Program), (3) IMPF (Industry Marketing Promotion Fund) (4) General RAC Funds, and the Export Replacement Offer ERO program. Under the last U.S. Farm Bill, all federal marketing orders operating promotion programs are required to have economic evaluations conducted to ascertain the extent of their impact on the market.

The purpose of this study is to measure the return on investment of raisin export promotion programs operated by the RAC. Unlike previous studies, this study measures the effectiveness of each of the five programs as well as the sum of all programs on enhancing California raisin exports. In addition, this is the first study to look at all countries importing California raisins (past evaluations have looked at only the most important countries, e.g., Japan and the United Kingdom). Hence, it offers a more detailed and comprehensive evaluation than previous evaluations.

In two previous studies Kaiser (2006) and Kaiser and Liu (1996) found California raisin export promotion to be highly effective in Japan and the United Kingdom. In this study, the economic analysis is extended to the 12 countries/regions that import California raisins: Japan, China/Hong Kong, South Korea, Taiwan, Singapore, Thailand, Indonesia, Malaysia, Philippines, United Kingdom, Germany, and Scandinavia. Unlike the previous studies, this study includes an analysis of the largest single program operated by the RAC, the ERO program. **Similar to the two previous studies, the major finding of this study is that all five export promotion programs run by the RAC have been highly profitable to California raisin growers.**

In order to assess the effectiveness of the export promotion activities, an econometric modeling approach is used. The econometric approach quantifies economic relationships using economic theory and statistical procedures with data. This framework enables us to simultaneously account for the impact of a variety of factors that influence raisin import demand of the foreign market in question, including the price of California raisins, the price of competing supplier's raisins, exchange rates, population, consumer income, consumer tastes and preferences, and the California raisin industry's export promotion expenditures. By casting the evaluation in this type of framework, we can filter out the effect of other factors and, hence, quantify directly the net impact of California export promotion activities on raisin import demand of the foreign consumers.

This study provides answers to four key questions regarding the effectiveness of California raisin export promotion:

1. What is the responsiveness of the demand for California raisins in importing countries and overall with respect to California export promotion?

2. What would exports of California raisins have been in the importing countries and in total had there not been any California export promotion?

3. How does the gain in export revenue due to California export promotion compare to the costs of the promotion in the 12 importing countries and in total?

4. What is the marginal return of the export promotion programs in each importing country? Specifically, what is the gain in export revenue due to an additional 10% increase in the export promotion expenditures?

To address these questions, import demand equations for California raisins are econometrically estimated using data over the time period 1996-2008 for the 12 importing countries/regions. Unlike previous research, this study obtains a separate measure of the "export promotion elasticity" for each of the 12 countries/regions and each of the five programs being evaluated. The export promotion elasticity measures the percentage increase in imports of California raisins into each country given a 1% change in export promotion expenditures, while taking into consideration other factors that affect raisin demand in the foreign market.

In all countries, the estimated export promotion elasticities are found to be positive and statistically different from zero for at least one or more programs operating in the market. This means that the statistical evidence overwhelmingly supports the notion that California export promotion programs have the effect of increasing the demand for its raisins in the major importing countries. The overall average promotion elasticity across all programs and all countries is 0.204, meaning a 1% increase in promotion expenditures leads to a 0.204% increase in California raisin imports holding all other demand factors constant. On an individual country basis, the highest overall export promotion elasticities are in Taiwan, Japan, and Scandinavia. The lowest overall promotion elasticities are in Germany, China/Hong Kong, and Indonesia. On an individual program basis, the highest export promotion elasticities are for ERO, but all four other programs also have positive statistically significant impacts on raisin imports.

The above estimation results indicate that the answer to the first question of this study is affirmative: The California raisin industry's export promotion is having a positive and significant effect on its exports to foreign destinations. The estimated import demand equations are simulated to address the remaining three questions posed in this study. Two scenarios are entertained in the simulation for each country and each program:

1. Baseline Scenario - export promotion programs are in effect.

2. No-Export-Promotion Scenario –export promotion program in question is not in effect.

The difference between the above two scenarios gives the total impact of the export promotion on California raisin export quantity. The model is simulated over the time periods, 2005-2008. From 2005 to 2008, California raisin export promotion resulted in a **total** incremental increase in

imports of California raisins of 233,007 metric tons. In other words, had there been no California raisin export promotion in these countries over this period, **annual** California raisin imports would have averaged 58,252 metric tons less than they actually were. In percentage terms, this means that had there not been any export promotion programs run by the RAC, California raisin imports would have been 66.5% lower than they actually were.

Over the period 2005-2008, California raisin export promotion had the impact of adding 65,624 and 62,696 additional metric tons of California raisins, respectively in the United Kingdom and Japan (Figures 1 and 2). In other words, had there been no California raisin export promotion in the United Kingdom and Japan, imports would have been 78.6% and 62.6% lower, respectively, over this period. Collectively, the incremental imports due to export promotion in these two markets represents 55.1% of the total increase across all countries. Scandinavia is the third most important market for California raisins in terms of the impact of California raisin export promotions. Over this period, California raisin export promotion added an additional 51,054 metric tons of California raisin imports to Scandinavia. On a percentage basis, imports to Scandinavia would have been 88.1% lower than they actually were had California not implemented export promotion programs in this market. Export promotion of California raisins in Taiwan (Figure 10) also had a large responsiveness. From 2005 through 2008, California raisin export promotion programs increased imports to this country by 15,333 metric tons, or 93.4%. Export promotion of California raisins in South Korea (Figure 5) increased imports by 10,438 metric tons, or 79.6%. The responsiveness of California raisin export promotion in other markets also had significant incremental impacts on imports, including: Malaysia (Figure 6, 9,454 incremental metric tons due to promotion or 84.2% increase in imports) Singapore (Figure 9, 6,687 incremental metric tons due to promotion or 84.1% increase in imports) Philippines (Figure 7, 4,215 incremental metric tons or 82.9% increase in imports), and Germany (Figure 3, 3,866 incremental metric tons or 8.4% increase in imports).

Hence, it is clear that California export promotion programs have had a large positive effect on the level of imports to the various countries. This is consistent with previous findings by Kaiser and Liu (1996) and Kaiser (2006) who found large impacts in Japan and the United Kingdom, but the significance of this study is it extends the analysis to the many additional foreign markets and finds similar significant impacts of California raisin export promotion.

While it is clear that export promotion of California raisins had a major impact on boosting exports, the third question posed in this study is more bottom-line in nature: the comparison of benefits with costs. To answer this question, an average benefit-cost ratio (BCR) was computed for export promotion in all 12 countries and each of the five programs. The average BCRs, which are also known as average rates of return on investment, are useful since they provide a measure of the returns (in dollars) to the California raisin industry for every dollar invested in export promotion.

The following procedure was used to compute the average BCR in each country. To compute the benefits of export promotion, the gain in export quantity due to export promotion estimated from the simulation above was multiplied by the deflated export price for each year of the simulation. The average BCR was then computed by dividing this resulting monetary benefit value by the deflated combined cost of all export promotion activities in each country. The

resulting number measures the impact of one dollar invested in California raisin export promotion on generating additional gross export revenue.

The overall average BCR for all programs and all countries is 3.49. That is, each one $1.00 invested in all California raisin export promotion programs in all countries returned, on average, $3.49 in additional export revenue to the industry. For the five individual programs run by the RAC, the average BCR varied from a return of $1.80 for every dollar invested to a return of $25.15 for every dollar invested.

The overall average benefit-cost ratios for each country are larger than 1.0 except China/Hong Kong, Germany, and Indonesia, indicating that the benefits of export promotion in terms of expanding total export revenue were greater than the costs of the programs. Scandinavia, Japan, and Taiwan have the highest average returns. Over this period, each dollar invested in export promotion returned over $5.00 in additional raisin export revenue in each of these markets. The United Kingdom and Singapore also had above average BCRs, indicating these are relatively profitable markets for raisin export promotion.

The BCRs also vary by the type of export promotion program. On average across all countries/regions, RAC promotion had a substantially higher BCR than all other programs. The overall average BCR for RAC is 25.15, i.e., each dollar invested in RAC returned $25.15 in export revenue, on average, across all countries from 2005-2008. The MIP returned $14.26 per dollar invested, while the IMPF returned $9.49 per dollar invested, on average, over all countries for this time period. The MAP program, which is funded entirely by the USDA/FAS, returned $19.09 in export revenue for every governmental dollar invested across all countries from 2005-2008.

Each dollar invested in ERO returned $1.80 in extra total export revenue to the California raisin industry. The ERO had the lowest BCR of the five programs averaged over the 12 importing markets. This is not surprising since the ERO is a substantially larger program than the other four programs. Indeed, the average annual budget for the ERO from 2004-2008 was $57.5 million. The average for MAP, IMPF, RAC, and MIP combined over this same period was only $5.7 million per year. Programs that have substantially larger revenues tend to have lower BCRs because of diminishing returns, which simply means that as more and more money is invested into an activity such as advertising, the incremental return begins to diminish as the market becomes saturated with the advertisement. So, for example, increasing promotion from $1 million to $2 million may return $5 million in additional sales revenue, increasing promotion from $50 million to $51 million may only return $2 million in additional sales revenue. Economists refer to this phenomenon as diminishing marginal returns.

In order to explore the optimality of the raisin industry's export promotion investment in each country and program, marginal simulation analysis is conducted by simulating an additional scenario where promotion expenditures are increased by a small amount, 10%, and then compared with the baseline scenario. Marginal BCRs measure the impact of an additional dollar invested on export revenue, which is useful in allocation decisions. A marginal BCR less than 1.0 indicates that too much money is being invested in the activity, while a marginal BCR larger

than 1.0 indicates too little is being invested. Hence, if an organization had an additional dollar to allocate to activities, it should choose the activity with the highest marginal BCR.

The overall marginal BCR for all countries and programs is 1.20, which indicates a slight under-investment in export promotion since this number is slightly larger than 1.0. That is, if the Raisin Administrative Committee had an additional $1.00 to invest in export promotion, export revenue would increase by $1.20 and therefore it would be profitable for the industry to spend more than it currently is spending.

In terms of specific markets, Japan has the highest marginal BCR, which is equal to 1.99. Clearly, if additional money were available for export promotion, this region would be the place to invest it in. Other countries with relatively high marginal BCRs include: Scandinavia (1.87), Taiwan (1.60), and Singapore (1.32). These results suggest that the RAC could improve export revenues by pulling some of its promotion expenditures out of low marginal BCR regions such as China/Hong Kong, and Indonesia, and investing it in high marginal BCR regions such Scandinavia, Japan, and Singapore.

The marginal BCRs also vary quite a bit by export promotion program. RAC funded export promotion has by far the largest marginal BCR. An extra dollar invested in RAC in all countries would increase export revenue by $6.99. Both MIP (3.97) and IMPF (2.47) are also underfunded, as illustrated by their marginal BCRs being well higher than 1.0. MAP also has a high marginal BCR. An extra dollar invested by the government in MAP in all countries would increase export revenue by $5.05. The only program that has a marginal BCR lower than 1.0 is the largest program, the ERO, which has a marginal BCR of 0.76. These results suggest that the RAC should consider reallocating some of the ERO money to the other four programs.

An Economic Analysis of California Raisin Export Promotion Programs

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The Raisin Administrative Committee (RAC) was established, in part, to administer the Federal Raisin Marketing Order 989. One of the many functions of the RAC is to conduct export promotion activities in other countries to increase California raisin exports. Currently RAC uses a variety of programs to stimulate sales of raisins to export destinations, including: (1) MAP (Market Access Program), (2) MIP (Merchandise Incentive Program), (3) IMPF (Industry Marketing Promotion Fund) (4) General RAC Funds, and (5) ERO (Export Replacement Offer). Under the last U.S. Farm Bill, all federal marketing orders operating promotion programs are required to have economic evaluations conducted to ascertain the extent of their impact on the market.

The purpose of this study is to measure the return on investment of raisin export promotion programs operated by the RAC. Unlike previous studies, this study measures the effectiveness of each of the five programs as well as the sum of all programs on enhancing California raisin exports. In addition, this is the first study to look at all countries importing California raisins (past evaluations have looked at only the most important countries, e.g., Japan and the United Kingdom). Hence, it offers a more detailed and comprehensive evaluation than previous evaluations.

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China/Hong Kong, South Korea, Taiwan, Singapore, Thailand, Indonesia, Malaysia, Philippines, United Kingdom, Germany, and Scandinavia.

In order to assess the effectiveness of the export promotion activities, an econometric modeling approach is used. The econometric approach quantifies economic relationships using economic theory and statistical procedures with data. This framework enables us to simultaneously account for the impact of a variety of factors that influence raisin import demand of the foreign market in question, including the price of California raisins, the price of competing supplier's raisins, exchange rates, population, consumer income, consumer tastes and preferences, and the California raisin industry's export promotion expenditures. By casting the evaluation in this type of framework, we can filter out the effect of other factors and, hence, quantify directly the net impact of California export promotion activities on raisin import demand of the foreign consumers.

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California Raisin Administrative Committee Export Promotion Programs

The five export promotion programs examined in this study include the Industry Market Promotion Fund (IMPF), Merchandise Incentive Program (MIP), Market Access Program (MAP), general promotion funds from the RAC, and the Export Replacement Offer (ERO) program. Collectively, these programs have had an average total budget of $63.2 million since 1997 with $1.5 million for IMPF, $1.1 million for MIP, $1.9 million for MAP, $1.2 million for RAC, and $57.5 million for ERO.

The IMPF is a grower-paid advertising and promotion program for buyers/importers on a per-ton dollar basis. This program involves Asian markets only and is used as a portion of the matching funds for the MAP. However, in these countries the promotional funds earned by each importer must be used to advertise/promote the California raisin brand they import. The program year for earning funds is February 1 through January 31. The IMPF program is reviewed and approved by the Committee and USDA for each program year.

The MIP is a grower-paid cash-incentive program based upon minimum tonnage, and in some instances, market share of California raisins established by the Committee. The criteria is established each program year and applies to Natural Seedless raisins exported from February 1 through January 31. The cash incentive is earned by the importer when the program criteria has been met. The MIP is for Asian markets only. In selected Asian markets, the Committee encourages local importers to form a non-profit association to work together and exchange information. The informal association meets at agreed-upon frequency to review progress and plan methods to increase total country imports of California raisins. As an incentive to encourage these meetings, the RAC has agreed to pay meeting expenses when announced to the importer's

association membership and a local RAC representative is included. The “Association Fee” earned ranges between $5.00 and $15.00 per ton for documented imports. Receipts and minutes of meetings are required to support reimbursement. An association fee budget ceiling is established each crop year.

On an annual basis, the Foreign Agricultural Service (FAS) USDA announces promotional funds from their Market Access Program will be available to industries that desire funding to promote agriculture commodities and agree to follow the requirements provided by FAS. MAP utilizes the industry’s marketing plan that contains information about the Raisin industry, analysis of U.S. and world market situation, shipment history, as well as shipment goals in granting federal funds. A broad activity plan and proposed budget is included for each country. The RAC establishes performance goals for each market, and at the end of our year, measures the results and then reports back to FAS the findings. The Reserve Sales and Marketing Subcommittee, with approval from the Committee, assigns a country budget and implementation begins. The raisin industry has participated and received federal funding to promote California raisins in selected export markets. MAP funds are used for both generic and branded activities. Additionally, the raisin industry contributes 120% of that amount in either cash or services to support the government funds received.

Other advertising and promotional activities are supported in various countries by RAC funds not delegated to the other three programs. Two specific examples of RAC’s promotion activities in Japan are the New Product Development Contest and the California raisin Sticker program. Each year RAC conducts new product development contests for the bakery and confectionery trade, and both have become very popular in Japan, as demonstrated by the increasing number of entries RAC receives each year. The goal is to roll out as many new raisin

products for consumers as possible. More than one hundred products that are currently on store shelves in Japan have come from these contests. RAC's California raisin Sticker program is also a promotional contest for Japanese consumers, who are encouraged to purchase raisin products with a special California raisin sticker that they can pull off and send in for a chance to win a variety of prizes. The tie-in between the trade and consumers is that the trade must first sign on to the promotion and put the sticker on its raisin products. Increases in both number of products and company participation are deemed essential for increasing consumption of California raisins among Japanese consumers. RAC Japan continues to promote raisin-containing recipe usage in salads, breads and pastries, entrees and desserts with nearly one hundred articles resulting per month in consumer & trade publications. Japan also had averaged nearly twenty-five television cooking show appearances for California raisins per year.

The ERO is designed to make California raisins more price competitive in export markets. This program began in the early 1980s as an in-kind program that allowed U.S. raisin exporters to purchase raisins at a lower than domestic price. In 1994, ERO was half raisin-back and half cash-back and it changed in 1996 to a "cash-back" program, whereby exporting handlers could qualify for cash reimbursements from the reserve pool for their export shipments. The ERO has been a cash-back program in all years since then, except for 2000, 2001, and a portion of 2002, 2008, and 2009. During 2000 and 2001 a raisin-back program was used and during 2002, 2008, and 2009 both "cash-back" and "raisin-back" programs were implemented. Assets for financing the cash-back program largely accrue from the 10 plus 10 sales of reserve raisins. Since 2005, an average of $60.6 million of reserve pool assets (cash and raisins) have been used to support exports of about 115,000 packed tons of raisins annually in both cash-back and raisin-back programs.

Econometric Methodology

To answer the four questions posed previously, this study quantifies the relationship between the export promotion effort of the California raisin industry and the imports of California raisins from the 12 foreign markets. The model is based on the economic theory of consumer demand. In theory, one expects that the export promotion activities are beneficial to California raisin growers because the promotion increases the demand of foreign consumers for California raisins, which results in higher export sales and revenues. However, there are also other factors that affect import demand. In order to distinguish the impact of the five export promotion programs on import demand for California raisins from the impacts of other factors, an econometric framework is adopted. The econometric approach quantifies economic relationships using economic theory and statistical procedures with data. It enables one to simultaneously account for the impact of a variety of factors affecting raisin import demand in the foreign market in question. These import-demand-determining factors (called "determinants") include the price of California raisins in the importing country, the price of competing supplier's raisins in the importing country, consumer income, exchange rates, and the raisin export promotion expenditures for each of the five programs pertaining to the importing country in question. By casting the export promotion evaluation in this type of framework, we can filter out the effect of other factors and, hence, quantify directly the net impact of California export promotion activities on raisin import demand of foreign consumers.

The raisin import demand models to be developed in this study uses annual time series data for the 12 countries for the period of 1996-2008. The models assesses how strongly various California raisin import demand determinants are correlated with the import demand in the

importing country in question. For example, with the model we are able to determine how important a change in California raisin prices is relative to a change in the MAP promotion expenditures regarding their impacts on import demand for California raisins.

The following factors are included in the import demand equation for each country to ascertain the extent, if any, of their impact on annual import demand for California raisins.

1. **Price of California raisins in each importing country**: The correlation (or elasticity) between this variable and the import demand for California raisins is expected to be negative. That is, an increase in the price of California raisins should be associated with a decrease in the import demand for California raisins in each importing country. As the price increases, California raisins become less price-competitive with raisin exports from other countries, holding all other factors constant. The source for this variable is Global Atlas, Inc.

2. **Price of competing exporting countries raisins in each importing country**: Since various countries compete with California exporters (e.g., Turkey, Australia, South Africa, and Greece), their prices should be positively associated with the import demand for California raisins. That is, an increase in say Turkish raisin prices should be associated with an increase in import demand for California raisins since they (California raisins) are now relatively less expensive. The source for this variable is Global Atlas, Inc.

3. **Gross Domestic Product in each importing country**: We expect this variable to be positively associated with the import demand for California raisins, as the Gross

Domestic Product reflects the purchasing power of the importing consumers. The source for this variable is USDA/ERS.

4. **Exchange rates**: The value of the U.S. dollar relative to importing country's currencies has an important impact on U.S. imports into that country. If the value of the dollar strengthens relative to the importing country's currencies, that makes U.S. imports more expensive, and causes a negative effect on import demand. To account for this impact, the exchange rate of each of the 12 countries relative to the U.S. dollar is included. The source for this variable is USDA/ERS.

5. **California raisin export promotion expenditures in each importing country:** The export promotion effort is measured as the expenditures on five programs, which are each included separately in the demand model: (1) MAP (Market Access Program), (2) MIP (Merchandise Incentive Program), (3) IMPF (Industry Marketing Promotion Fund) and (4) General RAC Funds. These are the key variables under investigation and one of the research goals is to conduct statistical tests to ascertain whether or not the coefficients associated with each export promotion variable are positive and statistically different from zero. The source for this data is the RAC.

To compare the relative importance of each factor on raisin demand, the results from the statistical (econometric) model are converted into demand "elasticities." A demand elasticity measures the percentage change in raisin demand given a 1% change in a specific demand factor, holding all other factors constant. For example, the computed price elasticity measures the percentage change in raisin demand given a 1% change in price. The computed MAP promotion elasticity measures the percentage change in raisin demand given a 1% change in MAP export promotion expenditures, and so on. Since demand elasticities are calculated for each demand

factor listed above, one can compare them to determine which factors have the largest impact on raisin demand in each of the 12 importing countries.

Econometric Results

Two versions of the raisin demand model are estimated using panel data with 12 countries/regions and annual time series 1996-97 through 2008-09 are used to estimate the demand equation. First, the demand model is estimated with the export promotion expenditures for the five programs combined as one variable. This model is used to examine the overall effectiveness of all five programs in increasing raisin demand. The second demand model is estimated with the export promotion expenditures for the five programs included as five separate variables. This model is used to examine the effectiveness of each of the five individual programs in increasing raisin demand.

Overall Impact of All Five Export Promotion Programs

The estimated demand equation for the first model (all five programs combined) is reported in Table 1. The equation is specified in double-logarithmic form, which has the convenient feature that each of the estimated coefficients has the interpretation of elasticity that measures the percent change in the demand for California raisins given a 1% change in the demand determinant in question, holding constant all other variables.[1] To account for the effects

[1] The double-logarithmic model was selected for four reasons. First, it provides a convenient nonlinear approximation of the function in question without requiring introduction of numerous additional parameters into the model. Second, the double-logarithmic specification is popular in the advertising and promotion literature because the functional form allows for the desired property of diminishing returns to promotion. Third, the estimated marketing coefficient has the convenient interpretation of being the marketing elasticity. Finally, two alternative functional forms (linear and square root) were explored in the estimation but yielded less satisfactory results.

of inflation, prices and GDP are deflated by the consumer price index for each importing country in the sample. Raisin export promotion expenditures were multiplied by the exchange rate index for the U.S. dollar relative to each country's currency and then this product is deflated by the consumer price index. Including exchange rates in this deflation technique ensures that the purchasing power of the U.S. dollar is adjusted when exchange rates change over time. For instance, a devalued dollar will have the effect of lowering the impact of export promotion expenditures, and hence this should be reflected in the export promotion expenditures. Because export promotion generally has a carry-over effect on demand, past promotion expenditures also are included in the model as explanatory variables using a distributed-lag structure.[2]

The Durbin-h statistic reported in the table indicates that the resulting estimated equation is free from serial correlation problems. Further, the equation fits the data extremely well; the adjusted R-square indicates that the demand equation explains 91.3% of the variations in demand for California raisins. The demand equation has elasticity signs that are consistent with economic theory, and the estimated coefficients are all statistically significant at the p-value < 0.05[3] or better except for the competing country price of raisins, which is significant at the 7% level. No multicollinearity was detected.

The import price of California raisins is the most important factor in explaining variations in raisin import demand in each country. The estimated own price elasticity is -1.507, indicating that a 1% increase (decrease) in the import price of raisins would result in a 1.507% decrease

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Specifically, the goodness-of-fit was similar among the three functional forms. However, the significance level of the estimated parameters suggested that the double-logarithmic model performed better.

[2] Specifically, a second-degree polynomial lag structure is imposed. The demand model included current export promotion expenditures and three years of lagged promotion expenditures to capture the carry-over effect.

[3] The p-value gives a measure of how statistically significant from zero the elasticity is and the closer the p-value is to zero, the more statistically significant the elasticity; generally p-values less than 0.100 are considered statistically significant.

(increase) in the quantity demanded for California raisins, holding all other demand factors constant. Clearly the import price of California raisins is an important determinant of its import demand.

The import price for competing country raisins is also an important determinant of import demand for California raisins, but is only marginally significant. The estimated cross price elasticity of California raisin demand with respect to the competing country import price is 0.361, indicating that a 1% increase (decrease) in the competing country import price of raisins would result in a 0.361% increase (decrease) in demand for California raisins, holding all other demand factors constant. The fact that this elasticity is positive and statistically significant indicates that competing country raisin imports are substitutes for California raisins.

Another important factor impacting the import demand for California raisins is per capita income. The income elasticity is estimated to be 0.739, indicating a 1% increase in per capita income results in a 0.739% increase in raisin demand, holding all other demand factors constant. California raisins are therefore considered what economists refer to as a “normal good,” as demand increases with increases in income.

The second most important factor impacting the import demand for California raisins is the value of the dollar, measured as an index (2009=1.0) of the value of the U.S. dollar relative to the local currency of each country in the data set. The exchange rate elasticity is -1.189 indicating a 1% increase in the value of the dollar relative to the importing country currency results in a 1.189% decrease in California raisin imports, holding all other demand factors constant. As the value of the dollar rises, it is more expensive for importers to purchase California raisins as they need to exchange their local currency for dollars to make such purchases.

Finally, and most importantly to this analysis, the elasticity associated with the five export promotion programs (combined) is positive and statistically different from zero. This means that the statistical evidence supports the notion that the export promotion efforts of the RAC have the effect of increasing the import demand for California raisins in the 12 countries/regions. The estimated export promotion elasticity is 0.204, which means that a 1% increase in combined raisin export promotion results in a 0.204% increase in import demand for California raisins. This is higher than most other generic marketing programs, as illustrated by previous studies summarized in Table 2 in the row labeled "estimated promotion elasticities". There are 44 U.S. export promotion elasticities reported in this table for various commodities and various importing countries. These estimates range from a low of 0.014 to a high of 0.98, and the median elasticity from the Table 2 studies was 0.0575.[4] Hence, the results of this study suggest that California raisin export promotion has a larger impact than the majority of other export promotion programs.

Individual Impact of Each Export Promotion Program

The results of the second model are presented in Table 3. This model is virtually identical to Model 1, except rather than combining the five export programs as one variable each are now included as five separate variables in the model. As was the case before, the model fits the data extremely well; the adjusted R-square indicates that the demand equation explains 87% of the variations in demand for California raisins. The demand equation has elasticity signs that are consistent with economic theory, and the estimated coefficients for all the variables except the exchange rate, MIP and IMPF are statistically significant at the 5% level or better. The

[4] Actually, there are a couple of negative estimates in this table, which were statistically not different from zero.

estimated elasticities are similar to the previous model, so the attention here is on the export promotion elasticities.

The estimated promotion elasticities ERO, MAP, and RAC are positive and statistically significant ($p < 0.062$ or better). The largest elasticity is for the ERO expenditures, which has an elasticity of 0.213, and is statistically significant at the 0% significance level. The MAP and RAC programs also have a positive and statistically significant impact on imports of California raisins with elasticities of 0.066 ($p < 0.006$) and 0.055 ($p < 0.062$), respectively. Using all the countries in the sample, the MIP and IMPF programs are found to not have statistically significant elasticities.

However, the lack of significance for the MIP and IMPF programs may be due to the inclusion of countries that have no MIP or IMPF program such as the European countries in the sample. In order to test this contention, Model 2 was re-estimated using only the Asian countries, and MIP and IMPF become statistically significant using this subset of countries. Specifically, the export promotion elasticity for MIP becomes 0.108, which is statistically significant at the 0% level. The export promotion elasticity for IMPF becomes 0.059, which is statistically significant at the 0% level. Consequently, in the subsequent analysis, the export promotion elasticity estimates from Table 2 are used for the ERO, RAC and MAP activities, while the estimated promotion elasticity for only the Asian countries is used for the MIP and IMPF programs.

Individual Export Promotion Program Impacts in Each Country

In order to determine whether or not the export promotion elasticities estimated in Table 3 vary by country, Model 2 is re-estimated by including an additional country indicator variable for

each program. Note that for IMPF and MIP, only the Asian countries are included in the regression, but for ERO, MAP, and RAC all countries are included. This is done separately for each country and for each program to determine whether each specific country has a statistically significant different export promotion elasticity for each of the five programs. The results of the country-specific export promotion elasticities, by program, are listed in Table 4.

All 12 markets have positive and statistically significant export promotion elasticities for at least some of the five programs. Taiwan has the largest response to the promotion programs of any country. Japan and Scandinavia also have relatively high promotion elasticities relative to the other countries. This is followed by Malaysia and Singapore. The three least responsive markets are Germany, China/Hong Kong, and Indonesia.

The econometric results provide strong evidence supporting the notion that RAC export promotion programs have the effect of increasing the demand for its raisins in all countries except Thailand. This leads us to the next step of simulating the effect of export promotion on quantity imported, using the estimated import demand equations.

Impact of Combined California Export Promotion Programs by Country

Based on the estimated import demand equations, it is clear that California raisin export promotions have had a positive and significant effect on its exports to all importing countries. But what about the actual incremental effects on imports to each country and in total, which is the second research question, posed in this study? To examine this question, the estimated country demand equations are next simulated under two scenarios to determine the impact of all export promotion programs combined on total and individual country imports:

1. Baseline Scenario – All export promotion programs are in effect.
2. No-Export-Promotion Scenario – Same as Baseline Scenario, except export promotion expenditures are set to zero for the program in question.

In the second scenario, all demand determinants except export promotion expenditures are set equal to historic levels. However, the export promotion variables are set to zero and the corresponding import demand is simulated over time for each country.[5] The difference between the two scenarios gives the impact of California raisin combined export promotion on imports of California raisins in the foreign markets in question.

The model is simulated over the most recent four-year period, 2005-2008, for each country. Figures 1-12 illustrate the simulation results on the quantity of imports for each country. These figures strikingly show the impact of California raisin export promotion programs on raisin imports. From 2005 to 2008, California raisin export promotion resulted in a **total** incremental increase in imports of California raisins of 233,007 metric tons. In other words, had there been no California raisin export promotion in these countries over this period, **annual** California raisin imports would have averaged 58,252 metric tons less than they actual were. In percentage terms, this means that had there not been any export promotion programs run by the RAC, California raisin imports would have been 66.5% lower than they actually were.

In terms of the various countries' responsiveness to California raisin export promotion, the largest markets for incremental California raisins sales due to California raisin export promotion are the United Kingdom and Japan. Over the period 2005-2008, California raisin export promotion had the impact of adding 65,624 and 62,696 additional metric tons of California raisins, respectively in the United Kingdom and Japan (Figures 1 and 2). In other

[5] Because of the logarithmic functional form, export promotion expenditures in all countries are set to a very small fraction (1%) of historical levels in this scenario since the log of zero is undefined.

words, had there been no California raisin export promotion in the United Kingdom and Japan, imports would have been 78.6% and 62.6% lower, respectively, over this period. Collectively, the incremental imports due to export promotion in these two markets represents 55.1% of the total increase across all countries.

Scandinavia (Figure 8) is the third most important market for California raisins in terms of the impact of California raisin export promotions. Over this period, California raisin export added an additional 51,054 metric tons of California raisin imports to Scandinavia. On a percentage basis, imports to Scandinavia would have been 88.1% lower than they actually were had California raisin export not implemented export promotion programs in this market. Export promotion of California raisins in Taiwan (Figure 10) also had a large responsiveness. From 2005 through 2008, California raisin export promotion programs increased imports to this country by 15,333 metric tons, or 93.4%. Export promotion of California raisins in South Korea (Figure 5) increased imports by 10,438 metric tons, or 79.6%. The responsiveness of California raisin export promotion in other markets also had significant incremental impacts on imports, including: Malaysia (Figure 6, 9,454 incremental metric tons due to promotion or 84.2% increase in imports) Singapore (Figure 9, 6,687 incremental metric tons due to promotion or 84.1% increase in imports) Philippines (Figure 7, 4,215 incremental metric tons or 82.9% increase in imports), and Germany (Figure 3, 3,866 incremental metric tons or 8.4% increase in imports).

Hence, it is clear that California export promotion programs have had a large positive effect on the level of imports to the various countries. This is consistent with previous findings by Kaiser and Liu (1996) and Kaiser (2006) who found large impacts in Japan and the United

Kingdom, but the significance of this study is it extends the analysis to additional foreign markets, to the ERO, and finds similar significant impacts of California raisin export promotion.

Average Benefit Cost Analysis

While it is clear that export promotion of California raisins had a major impact on boosting exports, the third research question posed is more bottom-line in nature, how do the benefits of California raisin export promotion compare with their costs. To address this question, an average benefit-cost ratio is computed for export promotion in each country and for each of the five promotion programs, as well as all countries and programs combined. The average benefit-cost ratios, also known as average rates of return on investment, are useful since they provide a measure of returns (in dollars) to the California raisin industry for every dollar invested in export promotion.

The following procedure is used to compute the benefit-cost ratio in each country and each of the five promotion programs. To compute the benefits of export promotion, the gain in export quantity due to export promotion estimated from the simulation previously described is multiplied by the deflated export price for each year of the simulation.[6] The annual deflated

[6] Kinnucan (1999) discusses the case of a small open economy where the supply curve is horizontal so there is no price response to the promotion-induced demand increase. In this case, export promotion does not yield benefits to growers because the additional revenue is perfectly offset by the additional production cost arising from the increased quantity. However, this is not the situation for RAC, which basically operates a surplus disposal program to enhance growers' revenue. At the beginning of the crop year, RAC estimates total crop production and the so called "trade demand," which includes domestic and foreign demand. Almost always, production is higher than trade demand given the relatively high negotiated, administered grower price, and hence RAC must deal with a surplus. Without additional outlets (e.g., additional sales in export markets), the surplus would eventually be dumped as low-value cattle feed or even discarded. Production costs on this surplus have already been incurred regardless of whether there is additional export demand. However, with additional export demand due to promotion, there would clearly be additional revenue to be distributed back to growers. Granted, it is conceivable that the increased grower revenue would eventually lead to more planted acreage and perhaps greater yields per acre. Due to the perennial nature of raisin grape crops and the fact that most of the production is located in a limited geographical area in the San Joaquin Valley, the potential supply response is likely to be minimal. Attempts to model domestic supply and demand conditions as done by Nuckton et al. (1988) were beyond the scope of this analysis.

benefits are then summed over the period 2005-2008. The average benefit-cost ratio is then computed by dividing the deflated stream of monetary benefits by the sum of the deflated combined costs of each export promotion activities over this period in each country. The basic interpretation of this benefit-cost ratio is that it measures the average impact of a dollar invested in export promotion on gross export revenue.

Table 5 presents the average benefit-cost ratios (BCRs) by program and country. The overall average BCR[7] for all programs and all countries is 3.49. That is, each $1.00 invested in all California raisin export promotion programs in all countries returned, on average, $3.38 in additional export revenue to the industry. Consequently, the total impact of all export promotion programs across all countries resulted in an expansion of total export revenue that is substantially greater than the costs of the programs.

In terms of individual countries/regions, Japan, Scandinavia, and Taiwan, have the largest average BCRs. In Japan, which is by far the largest raisin importing country, each dollar invested in the five promotion programs returned $5.18 in total export revenue for the California raisin industry. In a 2006 study, Kaiser found that each dollar invested in Japanese export promotion returned $9.27 in total export revenue. However, the 2006 analysis did not include the ERO program, which the current analysis finds has the lowest BCR of the five programs. In the current analysis, the average BCR for the four other programs (not including ERO) is 22.56, which is considerably higher than the 9.27 figure estimated by Kaiser (2006). The Scandinavian and Taiwan markets also have among the highest average BCRs. Each dollar invested in the five promotion programs in Scandinavia and Taiwan returned $5.76 and $5.19, respectively, in total export revenue.

[7] The overall average BCR is measured as the gain in total export revenue from all five RAC administered programs including the MAP program, which is funded by the USDA/FAS, divided by the total cost of the four RAC run programs excluding MAP.

The United Kingdom is the second largest importer of California raisins. The overall return of the five programs in this market is also positive. On average across all five-promotion programs, each dollar returned $3.69 in total export revenue. In the 2006 study, Kaiser found that each dollar invested in export promotion in United Kingdom returned $9.08 in total export revenue. However, the 2006 analysis only looked at two promotion programs in the United Kingdom – MAP and RAC. In the current study, the average BCR for MAP and RAC in the United Kingdom is 45.52, which is substantially higher than the 2006 study results.

Singapore, South Korea, Philippines, Malaysia, and Thailand also have average BCRs larger than 1.0 suggesting that the benefits from the five export promotion programs are larger than their costs. Each dollar invested in the five programs in Singapore, South Korea, Philippines, Malaysia, and Thailand returned $4.07, $2.83, $2.15, $1.33, and $1.34, respectively in additional export revenue.

Indonesia, Germany, and China/Hong Kong are the only markets that have a BCR less than 1.0 indicating that the benefits of the five promotion programs are lower than their costs. However, it is worth noting that the average BCRs for four of the five promotion programs in these three markets (excluding ERO) are larger than 1.0.

The BCRs also vary by the type of export promotion program. On average across all countries/regions, RAC promotion had a higher BCR than all other programs. The overall average BCR for RAC is 25.15, i.e., each dollar invested in RAC returned $25.15 in total export revenue on average across all countries from 2005-2008. The MIP returned $14.26 per dollar invested, while the IMPF returned $9.49 per dollar invested, on average over all countries for this time period. The MAP program, which is funded entirely by the USDA/FAS, returned

$19.09 in export revenue for every governmental dollar invested across all countries from 2005-2008.

Each dollar invested in ERO returned $1.80 in extra total export revenue to the California raisin industry. The ERO had the lowest BCR of the five programs averaged over the 12 importing markets. This is not surprising since the ERO is a substantially larger program than the other four programs. Indeed, the average annual budget for the ERO from 2004-2008 was $57.5 million. The average for MAP, IMPF, RAC, and MIP combined over this same period was only $5.7 million per year. Programs that have substantially larger revenues tend to have lower BCRs because of diminishing returns, which simply means that as more and more money is invested into an activity such as advertising, the incremental return begins to diminish as the market becomes saturated with the advertisement. So, for example, increasing promotion from $1 million from say $2 million to $3 million may return $5 million in additional sales revenue, but increasing promotion by $1 million at a higher level from say $50 million to $51 million may only return $2 million in additional sales revenue. Economists refer to this phenomenon as diminishing marginal returns.

Marginal Benefit-Cost Analysis

In order to explore the optimality of the raisin industry's export promotion investment in each country and program, marginal simulation analysis is conducted. The estimated import demand equations are used to simulate the outcome of an additional scenario for each country and program and the results are then compared with the baseline scenario:

3. 10% -Plus Scenario – A 10% increase in historical export promotion expenditures.

The difference between the third scenario and the baseline measures the marginal impact of a 10% increase in export promotion expenditures on California raisin export quantities. This gain in exports is multiplied by deflated export prices to arrive at a dollar measure of the gain in export revenue. A marginal benefit-cost ratio for export promotion programs is then computed in which the marginal benefits are the increase in export revenue due to the 10% increase in export promotion expenditures, and marginal costs are equal to 10% of deflated historical export promotion expenditures. Marginal BCRs measure the impact of an additional dollar invested on export revenue, which is useful in allocation decision. A marginal BCR less than 1.0 indicates that too much money is being invested in the activity, while a marginal BCR larger than 1.0 indicates too little is being invested. Hence, if an organization had an additional dollar to allocate to activities, it should choose the activity with the highest marginal BCR.

Table 6 displays the estimated marginal BCRs by country and program. The overall marginal BCR for all countries and programs is 1.20, which is pretty close to being optimal because it is so close to 1.0. That is, if the Raisin Administrative Committee had an additional $1.00 to invest in export promotion, export revenue would increase by $1.20 and therefore it would be profitable for the industry to spend slightly more on export promotion. In terms of specific markets, Japan has the highest marginal BCR, which is equal to 1.99. An additional dollar invested into this market would return $1.99 in total export revenue. Clearly, if additional money were available for export promotion, this region would be the place to invest it in. Other countries/regions with relatively high marginal BCRs include: Scandinavia (1.87), Taiwan (1.60), and Singapore (1.32). Overall spending on the five programs in the United Kingdom and South Korea is close to optimal since the marginal BCRs in these two countries are close to 1.0.

These results suggest that the RAC could improve export revenues by pulling some of its promotion expenditures out of low marginal BCR regions such as Philippines, Malaysia, Indonesia, Germany, Thailand, and China/Hong Kong and investing it in the higher marginal BCR regions such Japan, Scandinavia, Taiwan, and Singapore.

The marginal BCRs also vary quite a bit by export promotion program. RAC funded export promotion has by far the largest marginal BCR. An extra dollar invested in RAC in all countries would increase total export revenue by $6.99. MIP and IMPF are also underfunded since their marginal BCRs are also well above 1.0. An extra dollar invested in MIP and IMPF would return $3.97 and $2.47, on average across the 12 markets respectively, in total export revenue. MAP also has a high marginal BCR. An extra dollar invested by the government in MAP in all countries would increase export revenue by $5.05.

The marginal BCR for the ERO program, which is equal to 0.76, suggests that the funding of this program is higher than optimal since it is less than 1.0. These results suggest that some reallocation of funds from ERO to the other four programs would likely increase total export revenue.

Table 1. Estimated elasticities for raisin demand equation for Model 1 (combined programs).

Demand determinant	**Elasticity**	**p-value**
Price of California raisins	-1.507	0.000
Price of competing country raisins	0.361	0.070
Per capita GDP	0.739	0.000
U.S. exchange rate index	-1.189	0.002
Combined export promotion	0.204	0.000
Adjusted R-square*	0.913	
Durbin-h	0.130	

* The adjusted R-square indicates that the estimated equation explains 91.3% of the variation in demand for California raisins over time and country.

Table 3. Estimated elasticities for raisin demand equation for Model 2 (individual programs model).

Demand determinant	**Elasticity**	**p-value**
Price of California raisins	-0.402	0.025
Price of competing country raisins	0.509	0.009
Per capita GDP	0.584	0.000
ERO	0.213	0.000
RAC	0.055	0.061
MIP	0.000	NS
MAP	0.066	0.005
IMPF	0.000	NS
Adjusted R-square*	0.870	
Durbin-h statistic	0.120	

* The adjusted R-square indicates that the estimated equation explains 87% of the variation in demand for California raisins over time and country. NS means not statistically significantly different from zero.

Table 4. Export promotion elasticities by country and program.

	IMPF	MAP	MIP	RAC	ERO
China/Hong Kong	0.000	0.000	0.073	0.000	0.000
Germany	NA	0.019	NA	0.000	0.000
Indonesia	0.000	0.066	0.073	NA	0.013
Japan	0.058	0.066	0.073	0.033	0.213
Korea	0.058	0.000	0.073	0.000	0.213
Malaysia	0.058	0.066	0.008	0.055	0.213
Philippines	0.000	0.066	0.049	0.055	0.213
Scandinavia	NA	0.086	NA	0.147	0.230
Singapore	0.000	0.100	0.000	0.055	0.245
Taiwan	0.093	0.066	0.164	0.055	0.213
Thailand	0.058	0.000	0.234	0.000	0.000
United Kingdom	NA	0.066	NA	0.055	0.213

NOTE: NA means not applicable since there was no program for that country.

Table 5. Average benefit-cost ratios by country and program.

	IMPF	MIP	RAC	ERO	MAP*	Overall**
China/Hong Kong	0.00	4.75	0.00	0.00	0.00	0.06
Germany	NA	NA	0.00	0.00	13.89	0.24
Indonesia	0.00	75.89	0.00	0.14	0.00	0.69
Japan	13.36	17.52	6.59	2.99	52.48	5.18
Korea	10.38	12.85	0.00	1.77	0.00	2.83
Malaysia	0.00	0.78	24.96	0.82	10.85	1.33
Philippines	0.00	5.87	19.48	1.21	11.09	2.15
Scandinavia	NA	NA	1,619.00	2.56	103.99	5.76
Singapore	0.00	0.00	38.93	2.45	20.37	4.07
Taiwan	12.52	29.95	72.18	1.87	38.30	5.19
Thailand	1.21	5.33	0.00	0.00	0.00	1.34
United Kingdom	NA	NA	81.94	2.09	9.10	3.69
Overall	9.49	14.26	25.15	1.80	19.09	3.49

NOTE: NA means not applicable since there was no program for that country.

*The BCR for the MAP has a different interpretation than the BCRs for the other programs since the MAP is funded by the government. The BCR for the MAP measures the dollar return to raisin growers from every government dollar invested in MAP.

**The overall BCR is defined as the gain in total export revenue from all five RAC-run export promotion programs divided by the cost of the four RAC programs excluding the MAP program, which is funded entirely by the USDA/FAS.

Table 6. Marginal benefit-cost ratios by country and program.

	IMPF	MIP	RAC	ERO	MAP*	Overall**
China/Hong Kong	0.00	1.26	0.00	0.00	0.00	0.02
Germany	NA	NA	0.00	0.00	3.28	0.06
Indonesia	0.00	20.27	0.00	0.14	0.00	0.18
Japan	3.44	4.63	1.61	1.55	13.74	1.99
Korea	2.67	3.42	0.00	0.62	0.00	0.88
Malaysia	0.00	0.18	6.39	0.29	2.84	0.41
Philippines	0.00	1.48	5.00	0.43	2.90	0.65
Scandinavia	NA	NA	501.70	0.93	28.40	1.87
Singapore	0.00	0.00	9.96	0.92	5.75	1.32
Taiwan	3.47	9.58	18.47	0.66	10.03	1.60
Thailand	0.31	1.95	0.00	0.00	0.00	0.45
United Kingdom	NA	NA	20.95	0.74	2.38	1.15
Overall	2.47	3.97	6.99	0.76	5.05	1.20

NOTE: NA means not applicable since there was no program for that country.

*The BCR for the MAP has a different interpretation than the BCRs for the other programs since the MAP is funded by the government. The BCR for the MAP measures the dollar return to raisin growers from an additional government dollar invested in MAP.

**The overall BCR is defined as the gain in total export revenue from all five RAC-run export promotion programs divided by the cost of the four RAC programs excluding the MAP program, which is funded entirely by the USDA/FAS.

Figure 1. California raisin imports to Japan with and without export promotion, 2005-2008.

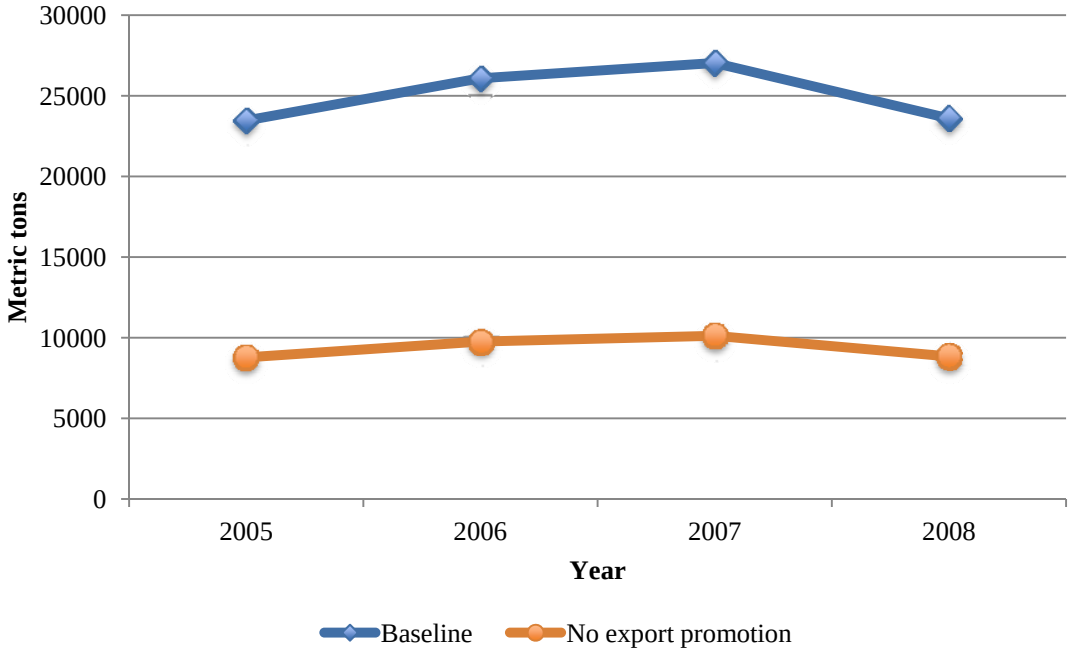

Figure 2. California raisin imports to the United Kingdom with and without export promotion, 2005-2008.

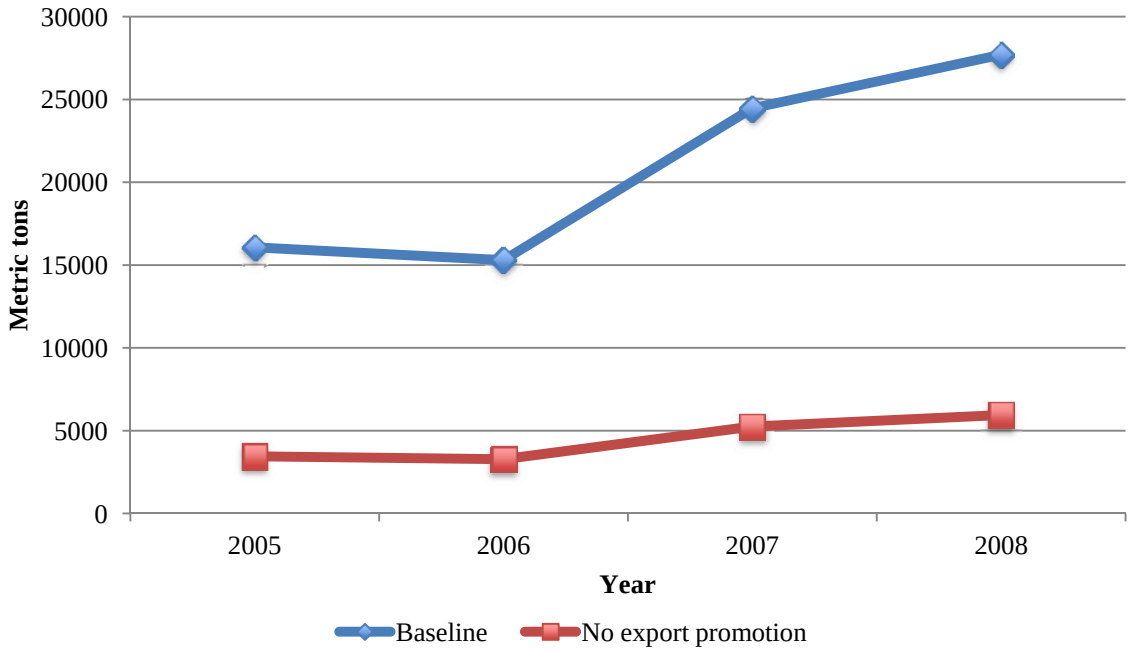

Figure 3. California raisin imports to Germany with and without export promotion, 2005-2008.

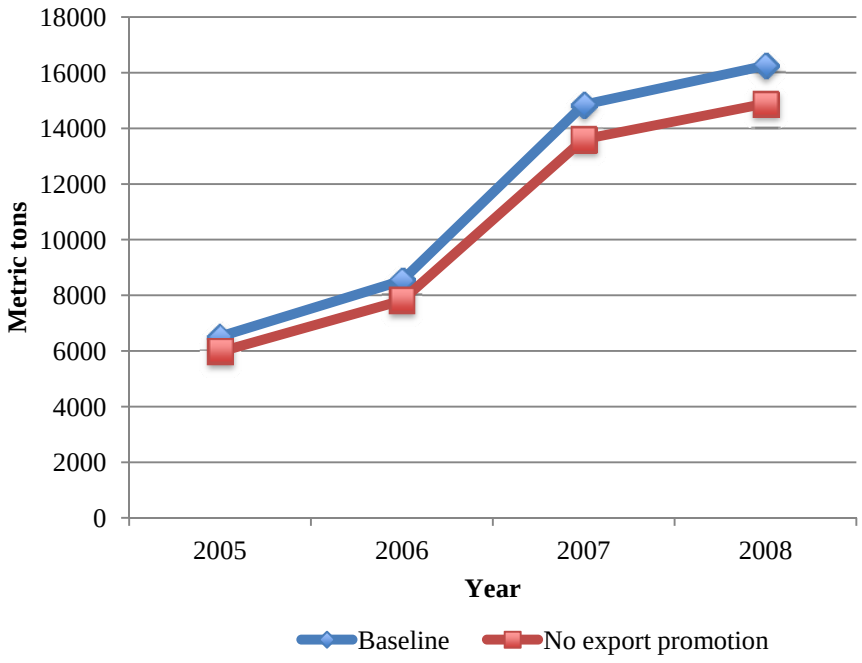

Figure 4. California raisin imports to Indonesia with and without export promotion, 2005-2008.

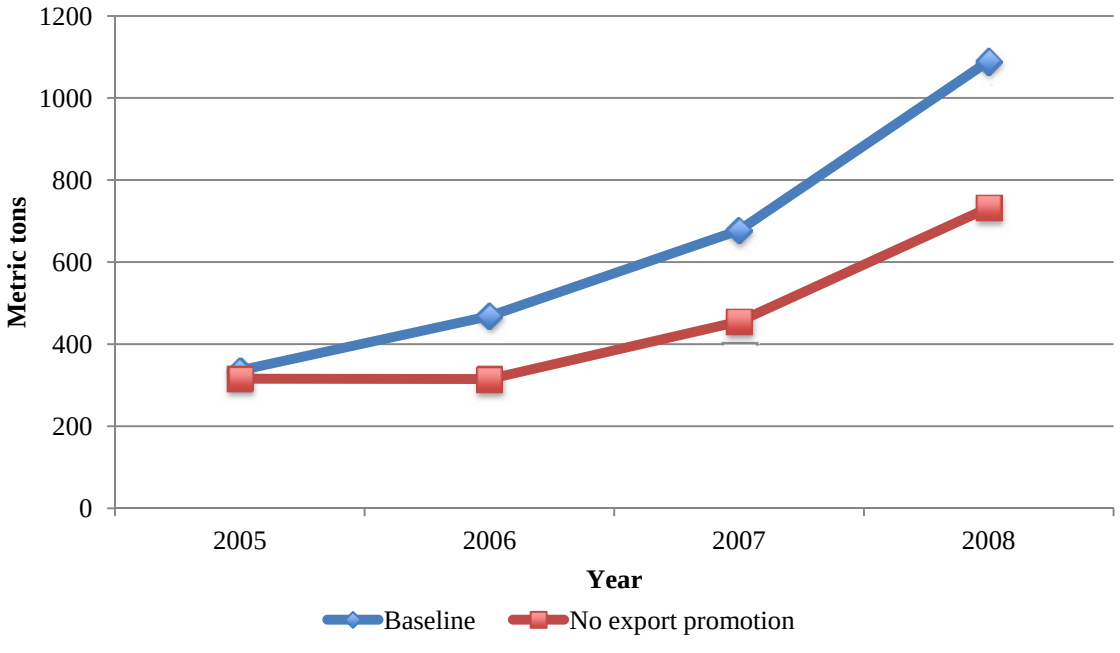

Figure 5. California raisin imports to S. Korea with and without export promotion, 2005-2008.

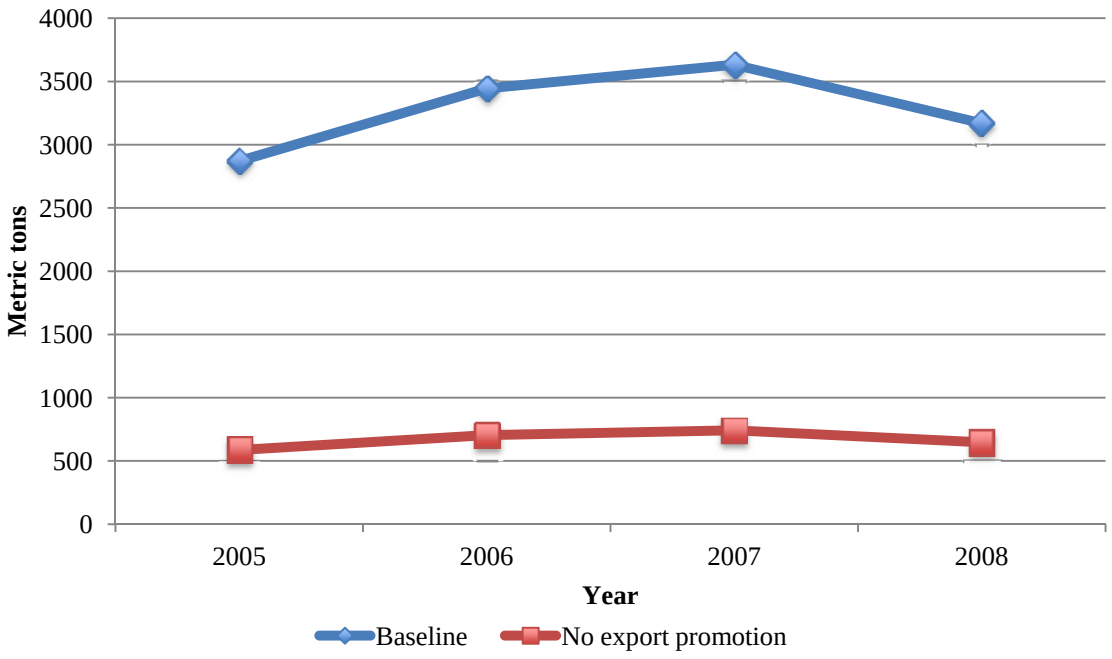

Figure 6. California raisin imports to Malaysia with and without export promotion, 2005-2008.

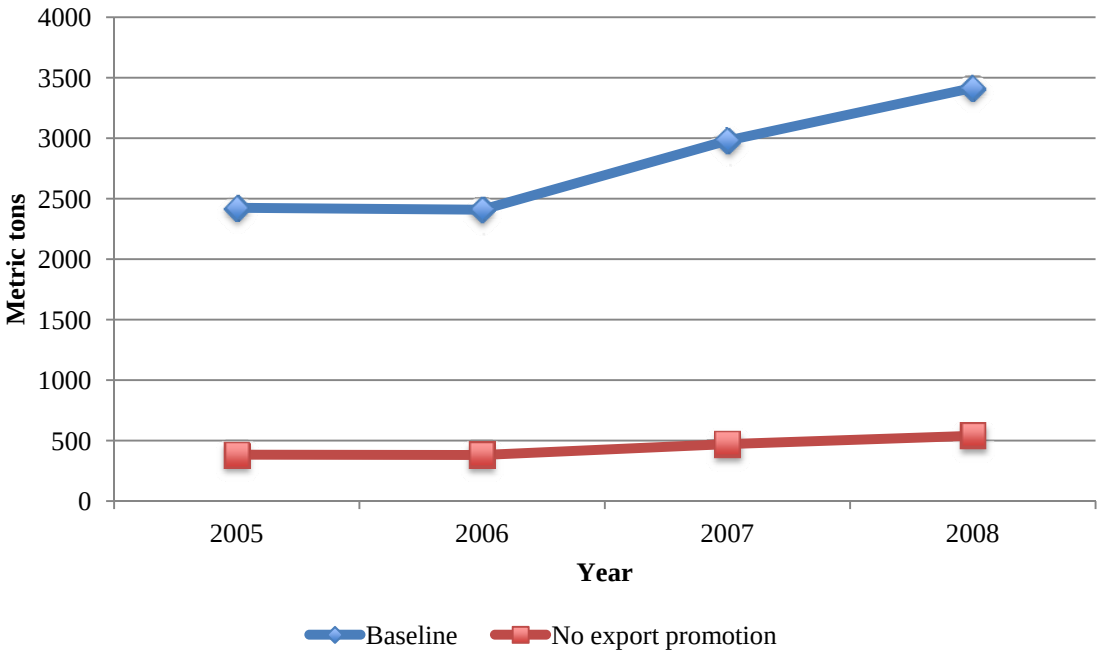

Figure 7. California raisin imports to Philippines with and without export promotion, 2005-2008.

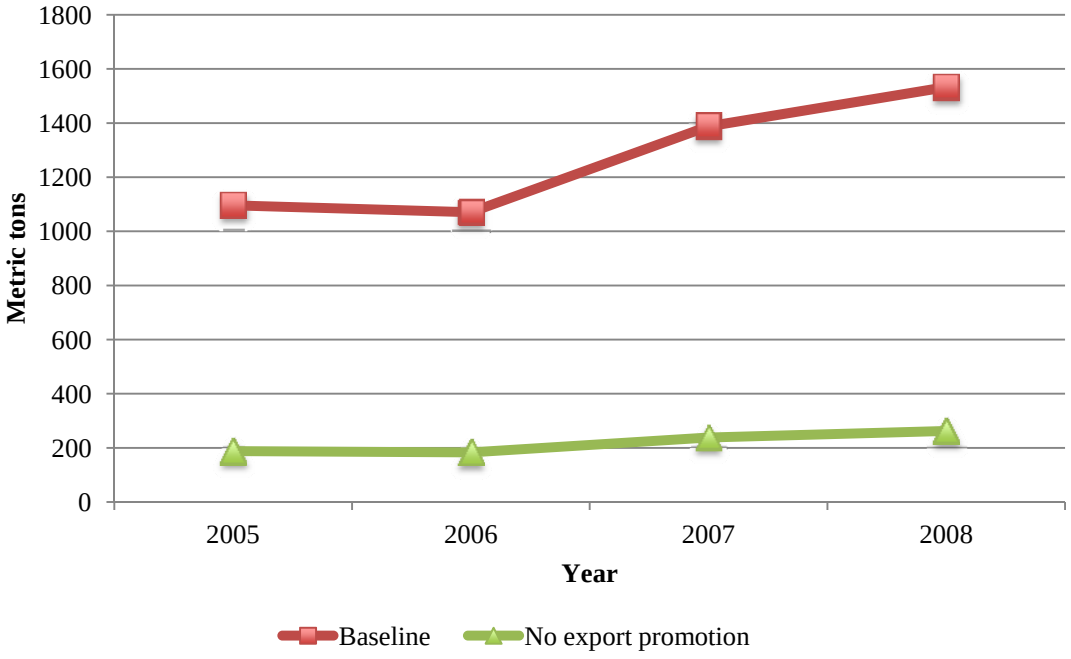

Figure 8. California raisin imports to Scandinavia with and without export promotion, 2005-2008.

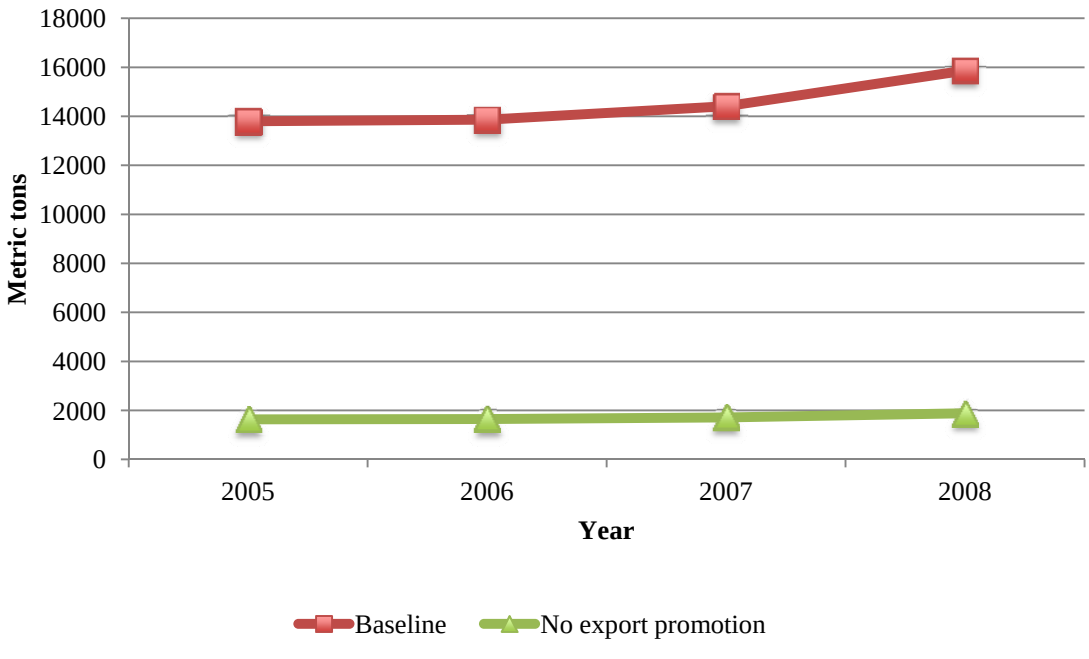

Figure 9. California raisin imports to Singapore with and without export promotion, 2005-2008.

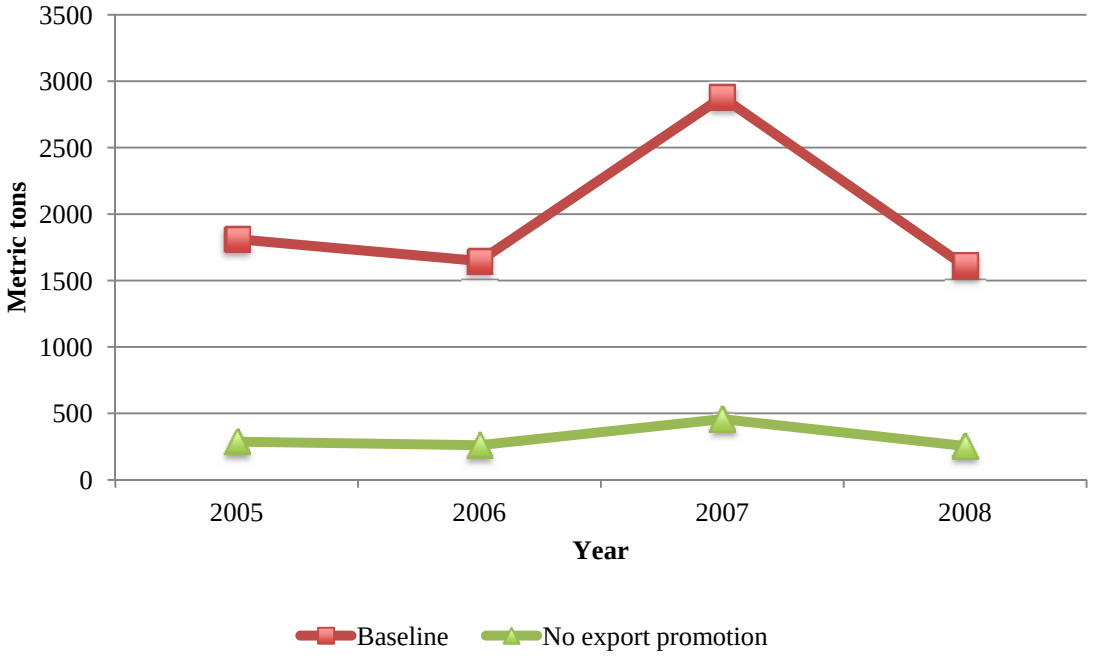

Figure 10. California raisin imports to Taiwan with and without export promotion, 2005-2008.

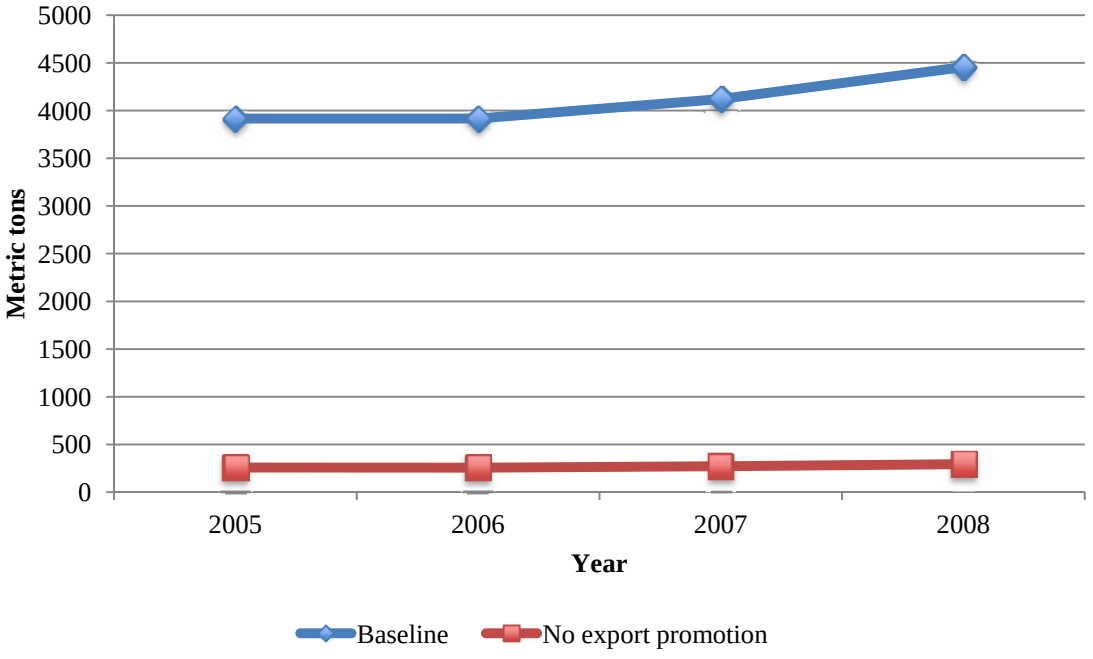

Figure 11. California raisin imports to China/Hong Kong with and without export promotion, 2005-2008.

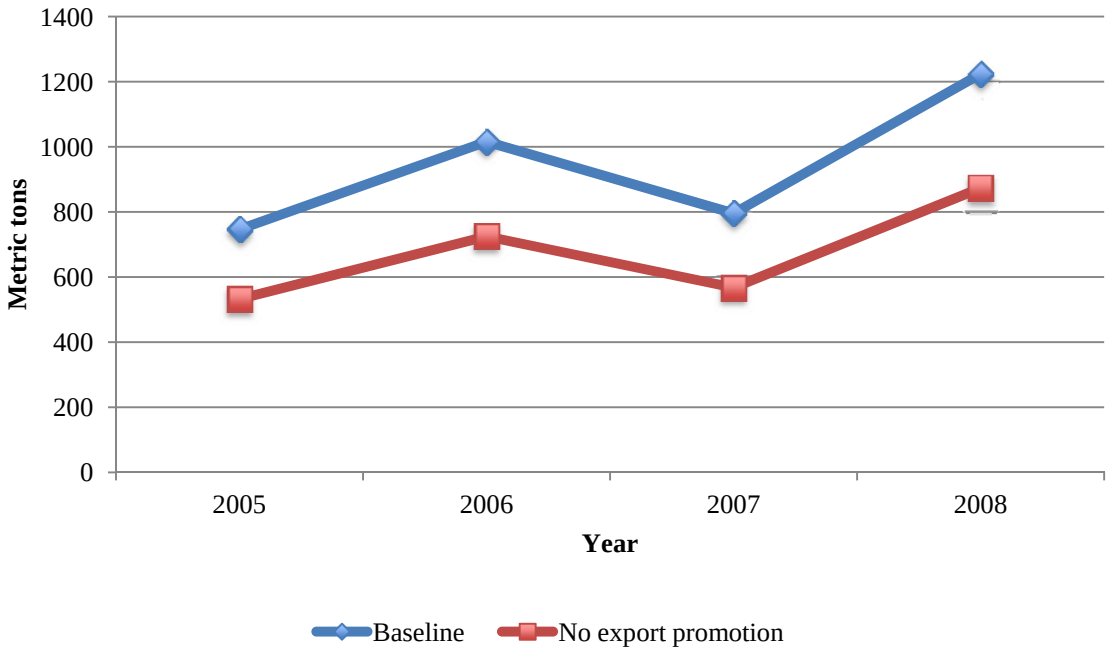

Figure 12. California raisin imports in Thailand with and without export promotion, 2005-2008.

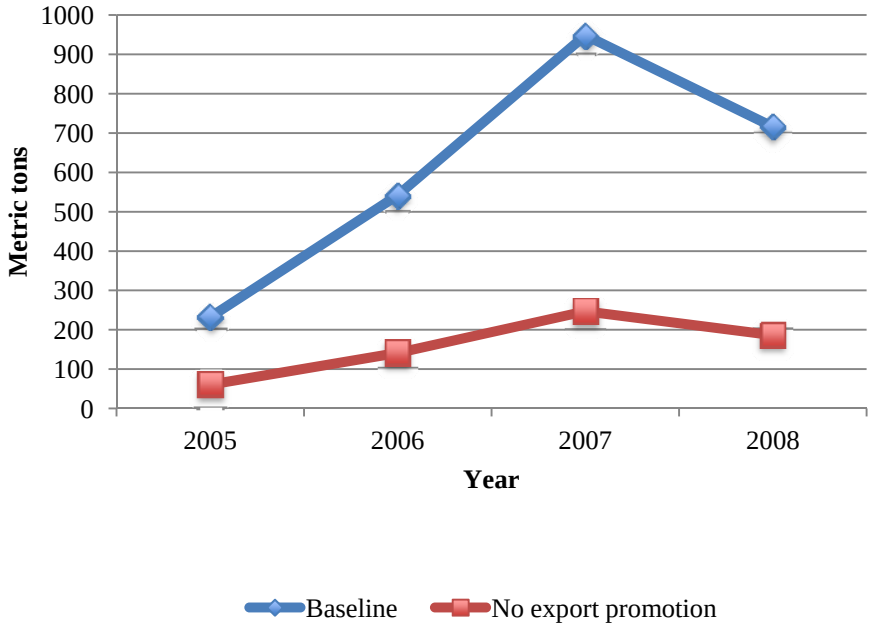

Table 2. Key results from economic impact studies on U.S. export promotion.

	California raisins	US orange juice	US orange juice	US fresh grapefruit	US apples	US apples
Study	Kaiser, Liu, and Consignado (2005)	Lee and Brown (1986)	Armah and Epperson (1997)	Fuller, Bello, and Capps (1992)	Rosson, Hammig, and Jones (1986)	Richards and Patterson (1997)
Activities evaluated	Industry and FAS programs	Three Party program	Industry and FAS programs	FAS Three Party and TEA programs	Industry and FAS programs	Industry and FAS programs
US export promotion in:	Japan and UK	13 European countries	France, UK, Germany, Japan Netherlands	Japan, Canada, France, and Netherlands	All countries US has programs in	Singapore and UK
Period of estimation	1965-98	1973-82 (panel data)	1984-92 (panel data)	1969-88 quarterly	1972-81	1962-93
Type of model	Import demand, single equations	Import demand, single equations	Export demand, single equation	Import demand, single equations	Export demand single equations	Import demand, LES/AIDS demand systems
Estimated promotion elasticities	Japan=0.029* UK=0.133*	Promotion elastitcities not given	France=0.014 Germany=0.044* Japan=0.014 Netherlands=0.302* UK=0.014*	Japan=0.109* Netherlands=0.153* France=0.234*	Apples=0.51*	Singapore=0.055* UK=0.016*
Estimated benefit-cost ratio	Japan: AGBCR=5.13 MGBCR=0.42 UK: AGBCR=15.29 MGBCR=3.19	For all countries, MGBCR=5.51	MGBCRs: France=7.44 Germany=37.10 Japan=5.61 Netherlands=51.92 UK=7.64	MGBCR:Japan=5.02 Netherlands=6.65 France=4.13 Canada=no promotions	MGBCR=60.0	NA
Peer reviewed	Yes	Yes	Yes	Yes	Yes	Yes

Notes: AGBCR means average gross benefit-cost ratio; MGBCR means marginal gross benefit-cost ratio. * Means statistically significant at conventional significance levels, i.e., at least the 10% level.

Table 2. Key results from economic impact studies on U.S. export promotion.

	CA table grapes	US frozen potatoes	US pecans	US walnuts	US almonds	US cotton
Study	Alston et al. (1997)	Lanclos, Devodoss, and Guenthner (1997)	Onunkwo and Epperson (2000)	Weiss, Green, and Havenner (1996)	Halliburton and Henneberry (1995)	Solomon and Kinnucan (1993)
Activities evaluated	Industry and FAS programs	Industry and FAS programs	Industry and FAS programs	Industry and FAS programs	FAS FMD and MPP programs	FAS programs
US export promotion in:	Asian countries	Japan, Mexico, Philippines, Thailand	Asia and EU	Japan	Japan, Taiwan, Hong Kong, Singapore, South Korea	6 countries in the Pacific Rim
Period of estimation	1976-94	1978-93	1986-96 (panel data)	1986-96 (monthly data)	1986-92 (panel data)	1965-85
Type of model	Single equation, export demand	Import demand, single equations	Export demand, single equation	Event analysis	Import demand, single equations	Armington trade model
Estimated promotion elasticities	0.21*	Third Party: Japan=0.03* Philippines=0.53* Thailand=0.87*	Asia=0.98* EU=0.06*	$1000 in promotion increased exports by 4.5 tons	3 models range from -0.2788 to 0.85	Japan=0.53* South Korea=0.045* Hong Kong=0.21* Philippines=0.26* Thailand=0.045 Taiwan=-0.54
Estimated benefit-cost ratio	ABCR: 4.1-9.4 MBCR: 4.1-4.2	Third Party MGBCRs: Japan=1.29 Philippines=11.77 Thailand=16.36	Asia: MGBCR=6.45 EU: MGBCR=6.75	MGBCR=5.85	MGBCRs: Japan=4.95 Taiwan=5.94 Hong Kong=3.69	NA
Peer reviewed	Yes	Yes	Yes	No	Yes	Yes

Notes: AGBCR means average gross benefit-cost ratio; MGBCR means marginal gross benefit-cost ratio.
* means statistically significant at conventional significance levels, i.e., at least the 10% level.

Table 2. Key results from economic impact studies on U.S. export promotion.

	US red meat	US red meat	US soybeans	All US food exports
Study	Le, Kaiser, and Tomek (1998)	Comeau, Mittelhammer, and Wahl (1997)	Williams et al. (1998)	Dwyer (1995)
Activities evaluated	FAS FMD and TEA programs	FAS MPP and TEA programs	Industry and FAS programs	FAS programs
US export promotion in:	S. Korea, Taiwan, Hong Kong, Singapore	Japan	EU, Japan, and Rest of the World	World
Period of estimation	1984-94 (panel data)	1973-94	1969-96	1975-92
Type of model	Import demand, single equations	Inverse Almost Ideal Demand System	SOYMOD world market model	Armington trade model
Estimated promotion elasticities	Korea=0.598* HK=-0.019 Taiwan=0.047 Singapore=0.034	Japan price flexibilities wrt promotion ranged from 0.11* to 0.128*	Soybeans:EU=0.0234* Japan=0.0367* ROW=0.068* Soymeal:EU=0.0445* Japan=0.0733* ROW=0.0516* Soyoil:EU=0.0446* Japan=0.0323* ROW=0.0156*	Short-run=0.0135* Long-run=0.15*
Estimated benefit-cost ratio	MGBCR=15.62 to 47.32 for all 4 countries	MGBCR for beef ranged from 15.56 to 18.11	ABCR:13.5 (1978-89) 5.3 (1990-94) 11.3 (1978-94)	AGBCR=16.0
Peer reviewed	Yes	Yes	Yes	No

Notes: AGBCR means average gross benefit-cost ratio; MGBCR means marginal gross benefit-cost ratio.
* means statistically significant at conventional significance levels, i.e., at least the 10% level.