U.S. EXPORT PROMOTION OF HIGH-VALUE PRODUCTS: ANALYSIS OF THE FEDERAL PROGRAMS AND IMPLICATIONS OF THEIR EFFECTIVENESS

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PREFACE

The U.S. government's financial involvement in the promotion of agricultural products overseas has been an issue of growing debate in recent years. This study addresses the topic of export promotion in two professional articles to be submitted for publication. The first article examines the non-price promotion programs for bulk commodities with respect to those of high-value agricultural products via a comparison of the trade and market development activities for wheat and red meats. In the second article, the effectiveness of promotions for high-value products is evaluated using almonds as a case study. Specifically, an ad hoc import demand model is developed to determine the government's return on investment of the promotion of U.S. almonds in the Pacific Rim countries of Japan, South Korea, Taiwan, Hong Kong, and Singapore from 1986 to 1992. The effectiveness of the federal promotion programs in increasing import demand for U.S. almonds in the Pacific Rim is then used to determine what implications there are for federal promotion of U.S. pecans in the region.

Previous research on the effectiveness of U.S. non-price promotion programs has been limited to only a few agricultural products and has not included almonds. Therefore, the analysis of almond promotions in the Pacific Rim is an original work. The more recent time frame of the study and the application to pecans is also an important contribution to the existing base of knowledge.

At this time, I wish to acknowledge a few of the many people who have contributed to this thesis. Foremost, I wish to thank Dr. Shida Henneberry for her

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PAPER I

THE DIVERSITY OF US EXPORT PROMOTION PROGRAMS: A COMPARATIVE ANALYSIS OF WHEAT AND RED MEATS

INTRODUCTION

During the last twenty years, international trade has become increasingly important to the US agricultural sector. This is especially true for the wheat and red meat industries. Today, the United States ships roughly half of its wheat production and 5 percent of its red meat production to a multitude of destinations around the globe.[1,2] Together, wheat and red meats accounted for nearly 20 percent of the total value of US agricultural exports in 1992,[3] not only bolstering agricultural revenues but helping to offset the overall US trade deficit.

Over time, the pair have also received substantial support from the federal government's non-price export promotion programs--the Cooperator segment of the Foreign Market Development (FMD) Program and the Market Promotion Program (MPP), which replaced the Targeted Export Assistance (TEA) Program in the 1990 Farm Bill. These programs have been administered by the US Department of Agriculture's Foreign Agricultural Service (FAS). From 1986 to 1991, wheat received a total of $46 million in program funding whereas red meats received $49 million (Table I). The two categories, combined, accounted for 11 percent of total program expenditures for all agricultural products during the period.

However, pronounced differences in the trade and market development activities for wheat and red meats provide a unique platform from which to analyze the two US export promotion strategies. Underlying this comparison is the issue of the allocation of promotion funds to bulk versus value-added products. The bulk nature of wheat and its

function as a basic food staple have led to more than one hundred countries importing the grain in aid, credit, or cash terms. Red meats, on the other hand, are purchased by only a limited number of higher-income countries with a greater orientation toward value-added consumer products.

Thus, the primary objective of this study is to examine the non-price export promotion programs for the two commodities. Although a limited number of studies have evaluated the effectiveness of the export programs for individual commodities,[§] this is the first study to review and compare the promotion expenditure data for wheat and red meats. Specifically, the allocation of program expenditures is analyzed according to region and development stage for the period 1986 to 1991 and by promotion activity for the period 1986 to 1988. A description of major US trading partners, competitors, and market promotion activities is also included. Data availability was the primary factor in determining the timeframe of this analysis.

US TRADE OF WHEAT AND RED MEATS

International trade of wheat and red meats has developed into somewhat of a global rivalry during the past decade. The United States must compete with Australia, the European Community (EC), and Argentina for the supply of both commodities in most major markets. As shown in Figure 1, the United States holds sizable shares of the world wheat and red meat markets relative to those of major competitors. However, although the United States continues to be the world's largest exporter of wheat in 1990 with 32 percent of the world market, it has struggled to retain the levels of global market share held during the mid-1970s and early 1980s (Figure 2). To the contrary, the United States is not the largest trader of beef in the world (Figure 1), but red meats as a whole have been one of the fastest growing US exports in recent years (Figure 2).

[§] For references on the studies that have measured the effectiveness of promotion programs on US agricultural exports, see Lee and Brown;[4] Rosson, Hammig,[5] and Jones; and Williams.[6]

In fiscal year 1992, US exports of wheat, wheat flour, and wheat products totaled $4.5 billion or 23 percent of US bulk agricultural exports and 11 percent of total US agricultural exports (Table I). However, wheat flour and products accounted for as little as 4 percent of the total wheat category and were sent to roughly half as many destinations as wheat alone.[3] Despite a 51-percent increase from 1991 in wheat exports not including flour or products, the overall trend during the last decade has actually been stagnant, with shipments varying widely from year to year. This volatility has often reflected the government's shifting foreign policy agenda.

Historically, the majority of US wheat sales have been concessional, either under price reduction programs (the Export Enhancement Program), commercial credit guarantees (GSM 102 and 103), or food aid (Public Law 480). Government-assisted sales for all commodities accounted for more than one-fifth of total agricultural exports in fiscal year 1992,[1] with the percentage for wheat being much higher. Use of these programs has risen in recent years with the upheaval of the former Soviet Union and its switch from cash to credit .[7]

Trade with the former republics, particularly Russia, accounted for nearly a quarter of 1992 wheat shipments. The North African countries of Egypt and Bangladesh, together, received another 12 percent ($540 million) of mostly concessional shipments, while China purchased 9 percent ($370 million) and Pakistan 5 percent ($211 million). At just under $100 million, Israel reached a record export level, as did Yemen at $65 million. Important cash markets have been Japan ($539 million), South Korea ($245 million), the Philippines ($157 million), and Taiwan ($120 million), accounting for 12, 6, 4, and 3 percent of 1992 sales, respectively.[3]

US red meat exports have increased at a phenomenal pace in recent years. In fact, foreign sales have grown at an average annual rate of more than 10 percent since the mid-1970s and approximately 20 percent since the mid-1980s. As shown in Figure 2, this has been a marked contrast to the growth of wheat and total agricultural exports during the past

two decades. Wheat exports have even lagged behind total agriculture throughout the period.

Accounting for nearly a quarter of consumer-oriented exports and approximately 8 percent of the US agricultural total, US exports of red meats to the world topped $3 billion for the first time in 1992. Record sales were made to Japan ($1.7 billion), Mexico ($442.2 million), and South Korea ($233.3 million). All but 10 percent of US red meat exports are concentrated in these three markets and Canada ($437.8 million). The Canadian market, however, is usually excluded from the non-price promotion programs. Other important markets have been the EC, Hong Kong, Taiwan, and Singapore, as well as the non-EC countries of Switzerland, Sweden, and Austria.[3]

US red reat industry representatives believe that Japan, North Asia, and Mexico have the greatest potential for short- to medium-term gains.[8] With the recent slowdown in domestic consumption of red meats, the US beef industry, in particular, has become increasingly reliant on East Asian markets. Japan now represents more than half of US foreign meat sales, and the tendency toward importing high-quality consumer products from the United States is spreading to other Asian markets as well. Currently, China is even under consideration as a potential export market. According to USMEF, consumers in China's large urban areas to the south have sufficient incomes to afford red meat exports from the West.[9]

The Pacific Rim as a whole accounts for more than one-third of total US agricultural exports, and FAS expects trade to the region to continue to expand with five Asian countries slated as top growth prospects.[1] With implementation of the recent U.S.-Japan Beef and Citrus Agreement nearly finalized, the US red reat industry is equally optimistic about the future of red meat exports. Shipments to both Japan and the world are expected to increase to twice their current value by the year 2000.[8] Other red meat markets with potential for expansion in the long-term are Russia and several of the former Eastern Bloc countries.

BULK VERSUS VALUE-ADDED EXPORTS

The product mix of both global and US agricultural trade has been transformed during the last decade. Due to the many economic and political changes which have taken place throughout the world, higher-value consumer-oriented and intermediate products, such as fresh and processed red meats and wheat flour, are now the fastest growing segments of agricultural exports, while trade of bulk products, such as wheat, have steadily been declining.[10] This realignment both at home and in foreign markets could have implications for the allocation of federal promotion funding within the US agricultural sector.

Traditionally, bulk commodities have accounted for the majority of US and world agricultural production and trade. However, between 1983 and 1990, consumer-oriented high-value products displaced bulk commodities as the largest category of global agricultural trade. During this time, trade of bulk commodities dropped 5 percent to roughly one-third of the total, while the share of consumer-oriented products rose to 42 percent, an 80-percent increase over the eight-year period. FAS projects that within the next three to six years consumer-oriented exports will account for more than half of global agricultural trade.[1]

Although bulk commodities still account for the majority of US agricultural trade, consumer-oriented exports from the United States have doubled since 1985 to account for 32 percent of total US agricultural exports in 1992. This is compared to a declining share for bulk which fell from nearly two-thirds to roughly one-half of the US total during the same period. The increase in demand for higher-value products from the United States appears to be part of a broader consumer movement across the globe. Over the past decade, many major markets have experienced a shift in demographics toward higher incomes and double-income families, as well as a reduction in trade barriers, a change in tastes and preferences, and the growth of Western-style distribution channels such as restaurants and supermarkets.[1] However, despite the increase in US consumer food

exports, the United States still lags behind the EC in world trade of high-value products. The US effort has been limited by a number of factors, including significant trade barriers in foreign markets, high US labor costs, and either the size of the US domestic market being large enough to keep US producers satisfied at home or the attraction of off-shore production through licensing agreements and joint ventures with foreign companies.[10]

Although some may view the value-added movement as a short-lived fad, many within the agriculture and non-agriculture communities have emphasized the need for a diversified and expanded agricultural product portfolio to foster US competitiveness. The most recent advocate has been Whitney MacMillan, the chairman and chief executive of Cargill Inc., a leading trader of US grain. According to Mr. MacMillan, the outlook for US agriculture is greater value-added processing and increased exports of higher-value products.[11] Exercising only the traditional approach of exporting raw, bulk agricultural commodities has come under scrutiny for a number of reasons.[15] Critics label the practice as colonial and mercantilistic, compared to the vast gains which can be made from exporting high-value processed products instead. Obviously, US companies and US workers benefit from the value-added in manufacturing, but high-value products also have more stabilized prices than bulk products, are easier to differentiate through advertisting, and offer a greater rate of return than bulk agricultural commodities priced at 3-5 cents/lb. Furthermore, increased consumption of final products expands demand for primary inputs at the farm level.

In the livestock sector, it is also expected that exports of red meats and other high-value products will continue to increase. Exports of livestock products can be viewed as indirect exports of feed grains that benefit both the livestock and the feed grain industries. With advancements in refrigerator ship technology, it is argued that it is more cost efficient to transport pork than its feed-grain equivalent.[16] According to FAS and a recent study supported by the American Meat Institute and the National Pork Producers Council, indirect exports of feed grains in the form of meat are now the fastest growing segment of

feed grain exports.[12,13] Moreover, indirect exports have been found to have a multiplier effect on employment as well. A USDA study estimated that a 50-percent increase in employment results from transforming bulk commodities into value-added products.[16] However, indirect exports of bulk products in the form of value-added products have not always been emphasized. For example, although "hogs can be viewed as opportunities for repackaging corn as meat, ... until recently, the United States has been a net importer of hogs and a major exporter of corn".[14]

The Abel, Daft and Earley study further concludes that more than 10 percent of US jobs at meat, poultry, and dairy plants are either a direct or indirect result of increased exports of these products. The same study forecasts 20,000 to 30,000 new jobs to be created each year from increased meat, poultry, and dairy exports. It is believed that the increase in employment in value-added processing of all food products is already offsetting losses in the agricultural sector from the decline in the number of farmers.[11] Therefore, the movement can also be important for rural development in the United States since the majority of production and processing of meat, poultry, dairy, and many other agricultural products is concentrated in rural areas.

WHEAT AND RED MEAT PROMOTION PROGRAMS

Although FAS administers the government's promotion programs, the actual promotions are conducted by private US industry trade associations. The primary export market development organizations for red meats and wheat are the US Meat Export Federation (USMEF) and the US Wheat Associates (USW). These groups, known as cooperators, have home offices in the United States as well as branch offices overseas. Marketing plans are submitted to FAS every year by the cooperators for approval and appropriation. A more detailed description of the structure and objectives of the programs can be found in Henneberry et al.[17]

Expenditure data for the two promotion programs were collected from FAS accounting records for the period 1986 to 1991. However, the data presented a minor obstacle. Although the expenditures were categorized by commodity and country for each year, the program participants' marketing plans in 1989 and 1990 included activities for which individual countries were not initially specified. This problem was solved by the creation of a "dummy country" category to which budgets were assigned for countries without prior designation. Therefore, the "dummy country" is an account to which funds are directed when it is unclear where actual expenditures were made.

Market Development Activities

The success or failure of overseas promotion efforts often depend on the design and implementation of the marketing plans developed by the industry cooperators. The outcome of a cooperator's decision to promote one product over another in a certain market with a particular type of campaign can influence continued industry patronage to the association as well as federal funding for future projects. USW and USMEF have historically engaged in similar promotion strategies, but due to the differences in product and market mix, the two have utilized some activities more than others. Many of the similarities are based on the standard structure of the promotion programs and business savvy of the marketers, whereas differences stem from the relative emphasis given to each cooperator by the programs and the differing marketing goals of FMD and TEA/MPP.

Both USW and USMEF have used Cooperator and TEA/MPP funds in many of the same wheat and red meat markets. However, although the joint life of TEA and MPP has been only eight years, USMEF has received the majority of its funding from these two programs since it began operation in 1977.[18] On the other hand, USW has relied on the Cooperator Program for most of its funding over the past four decades. Due to the different timeframe expectations of the programs, USW has been able to finance most of its long-term projects with Cooperator funds. Any short-term campaigns which were

expected to produce noticeable benefits in a short period of time have usually been paid for with TEA/MPP funds.[19]

The standard marketing approach taken by USMEF and USW has involved both preliminary and follow-up activities. Before entering a country, information about the prospective market is gathered to determine if adequate potential for sales exists. Preliminary work has been done in the form of test-marketing specific red meat or processed wheat products, gathering market intelligence information from US government analysts in-country, or sending trade and marketing teams to identify prospective target segments. After a presence has been established in a market, current projects are maintained on a continual basis, and expansion into campaigns for new products or market segments is considered periodically. Common determinants of a market's potential for expansion are its growth in population or per capita income.[18,20]

In order to analyze market development activities, program expenditures have been divided into four general categories: Trade Servicing, Technical Assistance, Consumer Promotions (generic and branded), and Administration/Evaluation Costs. Administrative costs are specific to FMD, while evaluation costs are specific to TEA/MPP. Expenditure data for each category were collected from 1986 to 1988. Although more recent data would have been preferred, it was not available at the time of collection and categorization. While USW and USMEF spent money on all of the different types of program activities, technical assistance projects have been a common form of wheat promotions, and red meats have relied more on generic consumer promotions. For a breakdown of program expenditures for wheat by activity and region, refer to Henneberry.[21]

Trade servicing activities are geared toward buyers of red meat and wheat products. Examples of these activities are conferences with buyers in-country, short courses conducted in the United States, and foreign trade teams visiting the United States. Most of these events are designed to answer buyers' questions which may arise in the purchasing and use of US products. For instance, USW recently hosted a regional trade conference in

Nairobi, Kenya, and a Brazilian trade commission spent several weeks touring US wheat producing states last year.[19] Similarly, USMEF has worked with hotels and restaurants in most of the major beef and pork markets overseas through menu promotions and chef training seminars.[18] Informational services, such as newsletters and market reports, are also prepared by USW and USMEF under this category.[20] From 1986-1988, trade servicing accounted for 24 percent and 17 percent of the Cooperator Programs for red meats and wheat, respectively, while less than 10 percent of TEA/MPP funds were used for the activity (Figure 3).

Although somewhat analogous to trade servicing activities, technical assistance projects often require longer-term attention, especially in lesser developed wheat and red meat markets. They educate retailers, processors, and distributors on proper storage and preparation techniques, as well as inform them about the different uses for wheat and red meats. It is assumed that these promotions will aid in the development of the country's domestic industry and lead to an expansion in demand for US products. For example, aggressive technical assistance has begun to take place in Russia to prevent the wholesale market from adopting EC meat standards.[18] Other technical assistance projects, such as the establishment of baking schools and production facilities, have required a great deal of USW manpower in the field through the use of consultants in flour milling and food product manufacturing.[20] A baking school recently opened in Costa Rica, and the construction of a milling school in Venezuela is expected to be completed by mid-1993.[19] USW spent 31 percent of Cooperator funds and 21 percent of TEA/MPP funds on the activity between 1986 and 1988, while USMEF spent less than 10 percent of each program's funding on technical assistance during the same period (Figure 3).

Consumer promotions are those activities aimed directly at consumers. These have included cooking classes and demonstrations, eating contests, media advertising, and the distribution of recipes and nutritional information about wheat and red meats. Because consumer promotions assume that product knowledge is already at a base level, this

method usually has a faster, more direct effect on sales through traditional marketing channels than technical assistance projects. Generally, consumer advertising appeals to buyers' values and lifestyles by giving an image of quality and reliability to the products. Specific red meat activities at the retail level have been in-store supermarket promotions and cooking contests in Taiwan, Hong Kong, and Singapore, as well as weekly television commercials for US beef in Japan.[8,18]

Between 1986 and 1988, generic consumer promotions accounted for more than three-fourths of TEA/MPP funds for both products and 28 percent of expenditures under the Red Meat Cooperator Program (Figure 3). Although generic promotions have rarely been used in the Wheat Cooperator Program, an illustration of their use by TEA/MPP is *The Magic of Wheat*, a book recently developed by the USW office in Singapore containing a number of traditional recipes for wheat-based foods, such as noodles, vegetarian foods, and pastries.[19] Although branded promotions are not common for red meats and do not exist for wheat, they have been important for the expansion of US processed meat exports to Korea.[8]

The fourth category of activities is administration and evaluation. For both products, the evaluation costs of TEA/MPP have been minimal relative to the massive burden administrative costs have put on the Cooperator Programs. During the 1986-1988 period, administrative costs accounted for nearly half of wheat and red meat Cooperator expenditures (Figure 3). Since wheat receives the majority of its funding through the Cooperator Program, it has been impacted much more than red meats by this issue. However, although evaluation costs have been low, accounting for only 1 percent of the red meat program and incurring no costs in the wheat program, this likely reflects a lack of proper evaluation rather than any efficient, cost-saving methods.

Global Promotion Constraints

As mentioned in the earlier discussion of trade, the United States faces intense competition in most major wheat and meat markets. US producers are often undercut by

price due to the EC's Common Agricultural Policy and Australia's closer proximity to lucrative Asian markets. This has prompted greater attention to product differentiation in US promotion campaigns through buyers' perception of quality, reliability, and food safety factors.

In the global meat market, the export battle between US and Australian beef producers has resulted in a series of counteractive marketing campaigns. For example, both USMEF and the Australian Meat and Livestock Corporation held major beef campaigns in supermarkets throughout Japan in 1992.[22] US beef has typically been considered high-quality grain-fed meat compared to much of Australia's lower-quality grass-fed product. Other US selling points important to Japanese buyers have been the freshness of product and the ability to produce specific cuts.[18] Despite these advantages, all imports must compete with the preferred taste of domestic Wagyu beef, a highly marbled meat usually consumed on special occasions. Yet with the recent liberalization of the import market and the relatively lower price of imported beef from both the United States and Australia, Japanese consumption of beef has actually risen, making it more a dietary staple.[18]

US wheat has been the hardest hit by price constraints. Besides stepped-up production of major exporting countries, USW believes that the direct export subsidies used by the EC, Saudi Arabia, and Canada, and predatory pricing tactics used by the Canadian and Australian Wheat Boards and the Argentine Junta have led to a significant reduction in US global market share over the last two decades[19] While the United States has fought these pricing policies with those of its own (i.e., EEP), US wheat has also been promoted on the basis of its 12-month growing season, warm weather ports, strong infrastructure and transportation system, and numerous product varieties. With seven classes or types of wheat grown in the United States, US producers are unique from competitors in that they can supply any type of wheat in the world. For example, hard red winter wheat which accounts for about 40 percent of US wheat exports is good for bread-

making and some types of Asian noodles, whereas soft red winter wheat, which represents another quarter of US shipments, is best for making cookies, crackers, cakes, and pastries desired by transatlantic markets.[20]

A recent study has found that quality factors, such as cleanliness, may also influence the competitiveness of US wheat exports.[23] Although the importance of quality differs across markets, importers in higher income countries that do not receive government assistance are willing to pay a higher price for higher quality wheat. However, in subsidized markets or those that operate under state trading systems, importers are more likely to purchase lower quality wheat if the price is cheaper. This wheat is often supplied by the EC or Argentina. Promotions for cleaner, more expensive US wheat would be conducted in many of the same upper-income markets served by Canadian and Australian competitors.[23]

In the Japanese market for example, most of the promotion efforts have been in anticipation of quality issues and to dispel misgivings when they arise.[19] Because of concerns over heavy metal and chemical residues, Japan will only import wheat from the Northwest Pacific area of the United States. Ironically, China refuses to import the same US wheat because of other phyto-sanitary concerns. Although the legitimacy of these complaints has differed from market to market, countries such as Egypt that receive a large portion of US wheat as food aid have even been known to complain.[7] Logically, the right to complain should increase with the ability to buy for cash. In the same respect, as wheat-importing countries become more developed and begin to switch from credit to cash, the United States must be competitive to hold on to the market share it once took for granted.

Regional Analysis and Development Stage Profile

Both FMD and TEA/MPP funds have been used to promote wheat and red meat exports in more than 100 countries throughout the world. These countries have been grouped into seven geographical regions to illustrate the regional impact of the two export

categories on US agricultural trade.† In addition to a regional analysis, promotion expenditures for each market were also divided into three categories based on the economic development of the individual countries.*

Demand for wheat and red meats is often a good predictor of a country's stage of development. For example, in the initial stage, a country will usually only be able to afford wheat and other grains. However, as development progresses, incomes also begin to rise, increasing a country's standard of living and the demand for higher-value processed products. As shown in Figure 4, more than 60 percent ($5.1 million) of promotions for red meats through the Cooperator Program have taken place in Higher Developed Countries. The remaining portion of expenditures were evenly divided among NICs and LDCs. At the same time, approximately three-fourths ($24.6 million) of wheat promotions were allocated to LDCs under the Cooperator Program. HDCs received 14 percent, and NICs received 10 percent. Distribution of promotion funds through TEA/MPP were similarly biased, with 84 percent ($31.8 million) of red meat funding going to HDCs, while 77 percent ($8.3 million) of wheat funding went to LDCs.

The Pacific Rim has been the largest recipient of Cooperator funds for both red meats and wheat, accounting for just over half ($4.9 million) of red meat expenditures and more than 40 percent ($13.4 million) of wheat expenditures during the 1986-1991 period

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† The Pacific Rim includes east and southeast Asia along with Australia, New Zealand, and all other Pacific Ocean islands. Western Europe is defined by the twelve members of the EC and all other west European countries. Latin America includes all countries and islands in the Americas except Canada and Bermuda, which make up the North American region. The Middle East includes the Arab and Asian subcontinent countries from Turkey to Bangledesh, including the Arabian Peninsula. This region also covers all west and south Asian countries. Africa includes all countries on the African continent, whereas the former and currently centrally planned countries of Europe fall under the Eastern European region, including the former Soviet Union.

* The highly developed country (HDC) category is defined as most of the countries of Western Europe plus Japan, Australia, and New Zealand. Countries in transition from less developed countries (LDCs) to HDCs with robust economic growth over the past decade or so were labeled as newly-industrialized countries (NICs). Included in this category were the Four Asian Tigers of South Korea, Taiwan, Hong Kong, and Singapore, as well as the oil-rich Arabian Peninsula countries of Saudi Arabia, Kuwait, Bahrain, Qatar, and the United Arab Emirates. All other countries of the world were put in the LDC category.

(Table IIA). The majority of expenses for wheat in the region between 1986 and 1988 were administrative costs (56 percent), followed by technical assistance (26 percent), and trade servicing (12 percent). Similarly, administrative costs (50 percent) and generic consumer promotions (35 percent) were the largest expenses of the red meat program in the region. Japan and Taiwan have been a common focus of the Cooperator Programs for both commodities. China has been another main recipient of wheat funds, while South Korea, Hong Kong, and Singapore have also been targets of red meats.

The Cooperator Program has given significant attention to red meat promotions in Western Europe as well. From 1986 to 1991, the region accounted for one-fifth ($1.7 million) of program expenditures for red meats compared to less than 5 percent ($1.5 million) of wheat funding. A greater focus on red meats though the Cooperator Program is not surprising given the EC's ban on hormone-treated beef imports from the United States.[24] Consequently, the majority of red meat funding to the Western Europe region between 1986 and 1988 was in the form of trade servicing.

Latin America received $5.7 million (18 percent) from the Wheat Cooperator Program, making it the second largest recipient during the 1986-1991 period. Although the region received roughly 10 percent of expenditures through the Red Meat Cooperator Program, the value was less than $1 million. The Middle East and Africa also received sizable portions of the funding for wheat through the Cooperator Program, each at 15 percent or $4.9 million during the 1986-1991 period. In both regions, administrative costs accounted for more than 40 percent of expenditures between 1986 and 1988, while technical assistance activities accounted for around one-third. Eastern Europe was emphasized far less than other regions by both commodities, but relatively more by wheat with expenditures of $2.1 million from 1986 to 1991.

FAS regional spending on promotions for wheat and red meats has been much more concentrated in TEA/MPP than in the Cooperator Program. Accordingly, nearly 85 percent ($34.1 million) of red meat expenditures under TEA/MPP occurred in the Pacific

Rim, while more than 50 percent ($5.6 million) of wheat funding occurred in Africa between 1986 and 1991 (Table IIB). Most of the funding for meats in the Pacific Rim were generic consumer promotions, while a large percentage of wheat expenditures in Africa were for technical assistance projects. The Pacific Rim was the second largest region to receive wheat funding through TEA/MPP, accounting for just under one-third ($3.3 million) of the program's funding to all regions during the 1986-1991 period. Wheat expenditures in the region were primarily generic consumer promotions.

CONCLUDING REMARKS AND IMPLICATIONS

The push for greater trade and promotion of value-added agricultural products has been gaining momentum in this country for some time. While most agree that the United States must maintain its competitiveness in the global economy, a consensus concerning the means to that end has not been reached. Promoting products that bring a greater return to the US economy, such as higher-value processed items, would be a logical approach. Our foreign competitors understand this and have aggressively pursued the global high-value export market.

Over the six-year period of this study, the federal government has spent nearly $100 million promoting wheat and red meat exports. While each category received roughly equal shares of funding during this time, red meat exports have grown by more than $2 billion and wheat exports by less than $1 billion (Table I). Although it is impossible to determine the impact of the promotion programs on these exports without econometric analysis, the US Department of Commerce estimates that 19,100 jobs are created throughout the economy for every billion dollars of exports. Therefore, at the very least, it is assumed that the growth of red meat exports between 1986 and 1991 accounted for the growth of twice as many US jobs as wheat exports.[25] This point is stressed because the political sensitivity of the jobs issue is likely to influence Congressional funding for the export promotion programs.

Greater attention might also be given to the conduct of promotions by the cooperators. Both the US Meat Export Federation and the US Wheat Associates have promoted wheat and red meats on the basis of quality. However, the marketing strategy that works for value-added consumer products with distinct attributes or brand names may not work for unfinished bulk commodities. Even if wheat can be differentiated by quality through specification of grades and standards, the majority of US wheat exports are to developing countries, which import from the lowest-price supplier offering the best terms of credit. Wheat quality is a less important consideration in these markets compared to developed countries who usually buy with cash and no special terms of trade. In recent years, the United States has fought unfair competition in most of its wheat markets with subsidy practices of its own. Therefore, bilateral and multilateral trade policy negotiations may prove to be a more effective means of expanding US bulk exports on a fair playing field than generic consumer promotions.

The federal government's lengthy financial involvement in the promotion of wheat and red meats underscores their importance to US agricultural trade. However, Congress' decision to allocate federal money to the promotion of these and other agricultural exports may not be adequate for the policy to succeed. To escape the implication of political favoritism,[26] more stringent criteria may be needed at the departmental level or within the Foreign Agricultural Service to determine which products should be promoted. Although beyond the scope of this study, research determining the effectiveness of past promotion program expenditures is essential for guiding the allocation of future funding. Further research may also be needed to compare the effectiveness of the non-price promotion programs to that of the price subsidy programs, such as the Export Enhancement Program and GSM 102. In the wake of any conclusive results, a realignment of analysis and promotional funding toward value-added industries could be critical for the nation's well-being, especially as the United States struggles to reform its agriculture sector. If the federal government is to take a more active role in industry policies such as the non-price

export promotion programs, it should also fulfill its responsibility to the American taxpayers by supporting initiatives that are most beneficial to the US economy as a whole.

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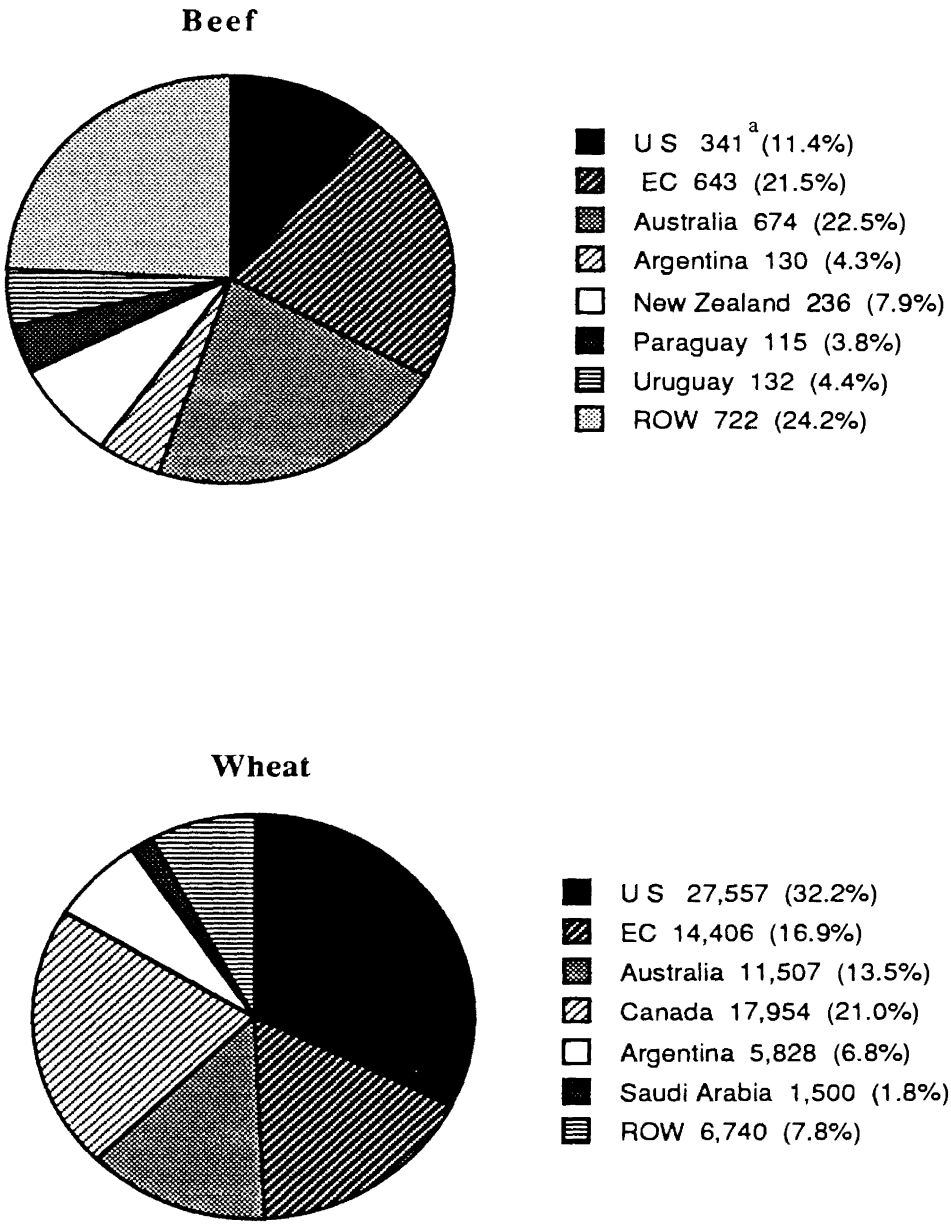
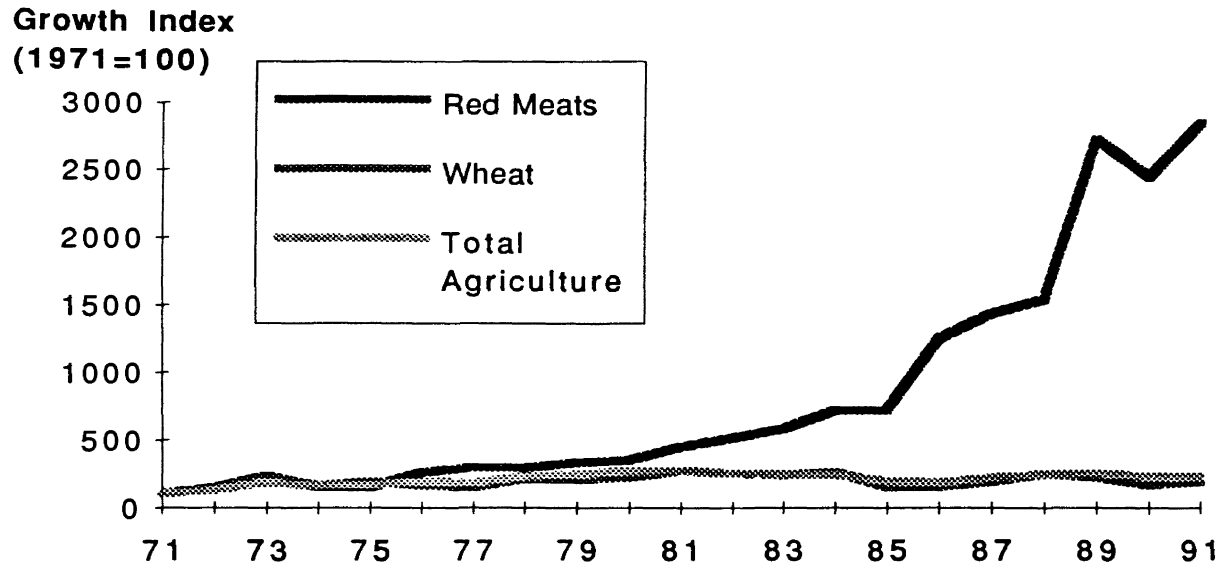
Figure 1. US Export Share of 1990 World Markets for Wheat and Beef.



[a] Volume figures are in thousand metric tons.

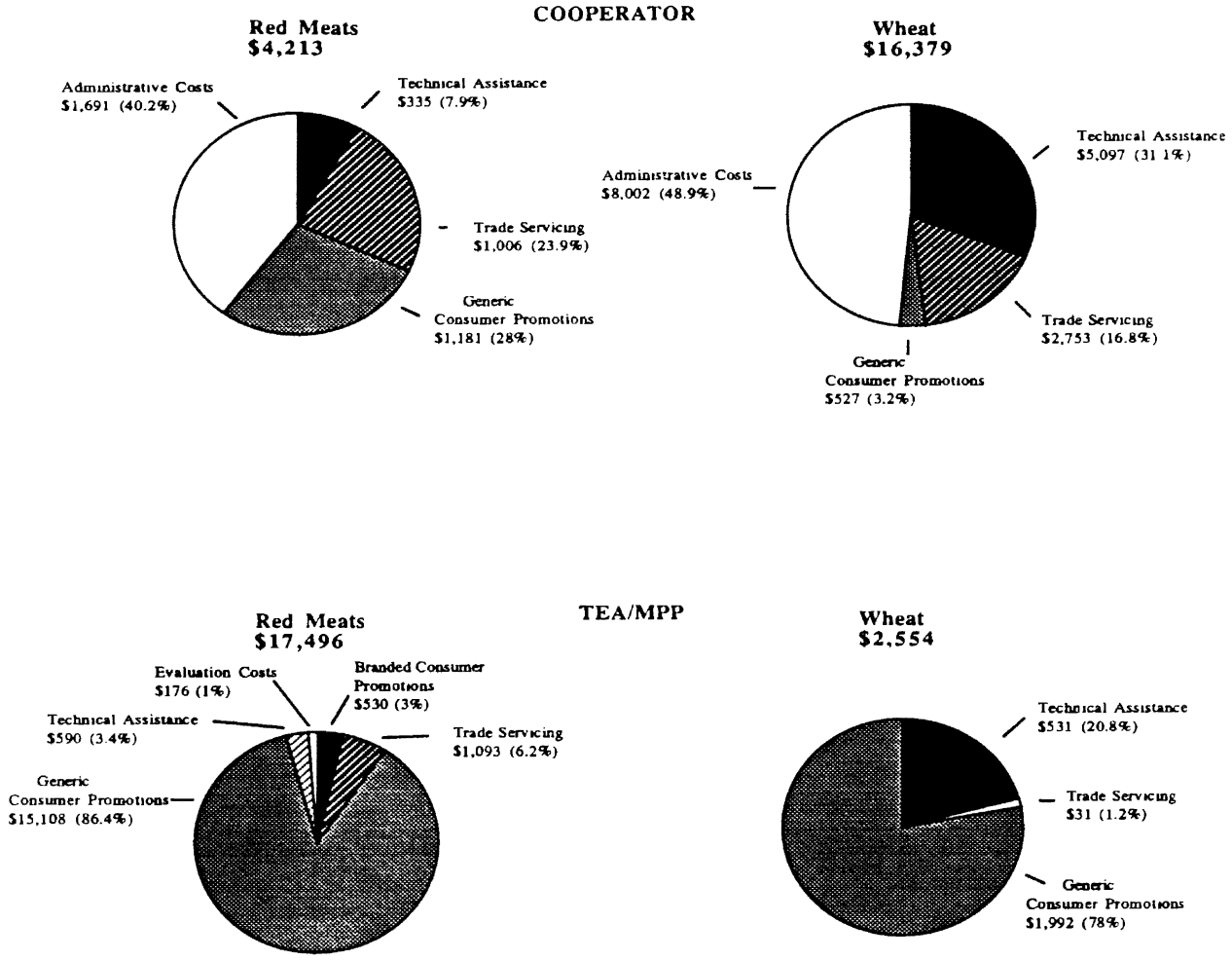
Source: Food and Agricultural Organization of the United Nations (FAO) data provided by FAS, USDA.

Figure 2. Growth of US Exports of Red Meats and Wheat to the World



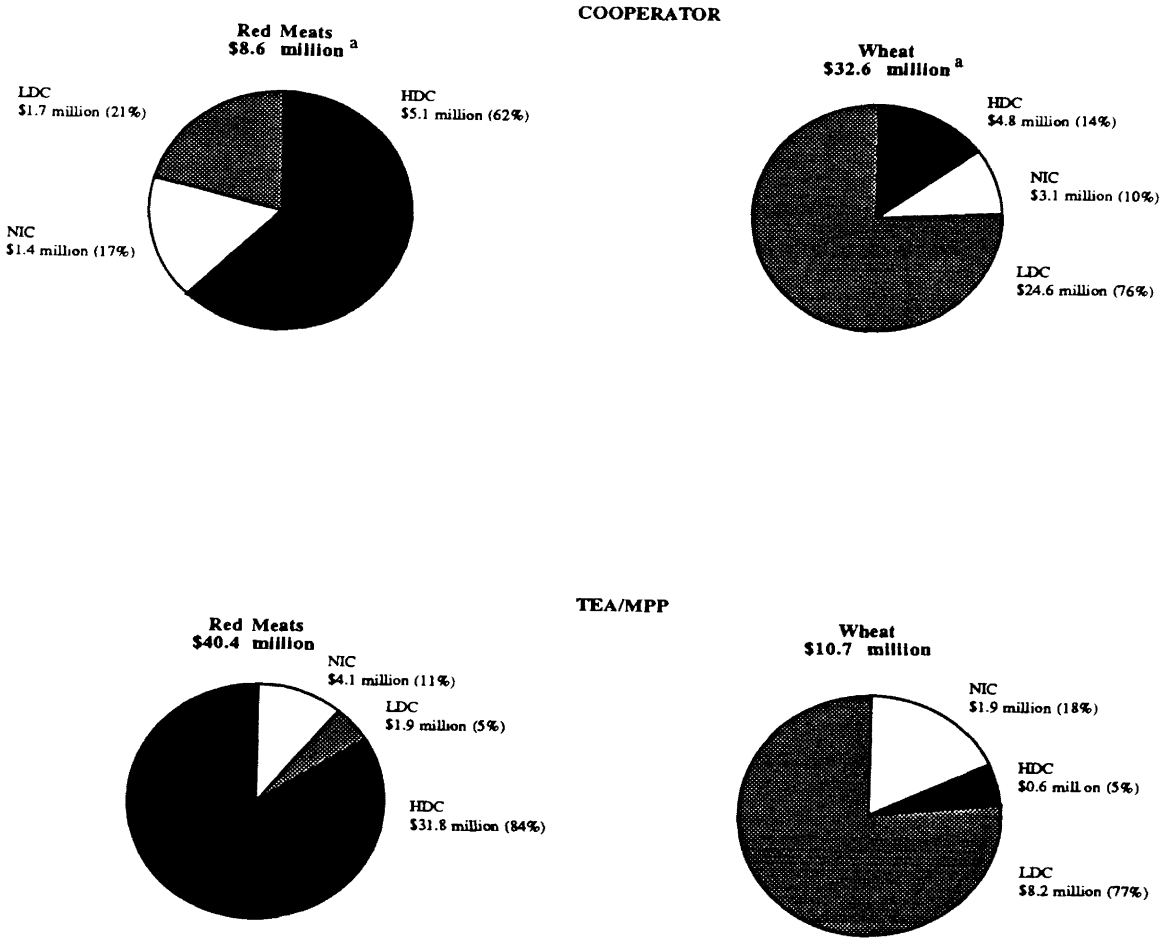
Source: US Bureau of the Census data provided by FAS, USDA.

Figure 3. FAS Export Market Development Expenditures by Activity, Red Meats and Wheat (in Thousand Dollars), Fiscal 1986-1988.



Source: Based on data provided by FAS, USDA (April 5, 1989).

Figure 4. FAS Export Market Development Expenditures by Development Stage, Red Meats and Wheat, Fiscal 1986-1991.



Note: HDC refers to the Highly Developed Countries.
NIC refers to the Newly Industrialized Countries.
LDC refers to the Lesser Developed Countries.

[a] The dummy country category for red meats ($2.6 million for TEA and $380,962 for the Cooperator Program) and wheat ($129,534 for MPP and $3 million for the Cooperator Program) are included in the total, but are not included in the charts.

Source: Based on data provided by FAS, USDA (April 5, 1989 and March 11, 1992).

Table I. US Exports and FAS Export Market Development Expenditures, Red Meats and Wheat (in Thousand Dollars), Fiscal 1986 - 1992.

Red Meats

Year	Red Meat Exports	Cooperator	TEA/MPP	Total
1986	1,010,888	1,465	6,846	8,311
1987	1,298,040	1,147	0	1,147
1988	1,794,834	1,603	10,650	12,253
1989	2,332,257	1,619	6,771	8,390[a]
1990	2,424,174	1,240	6,963	8,203[a]
1991	2,748,123	1,528	9,164[b]	10,692
1992	3,195,674	c	c	c

Wheat

Year	Wheat Exports	Cooperator	TEA/MPP	Total
1986	3,574,236	5,656	1,064	6,720
1987	3,120,544	4,963	125	5,088
1988	4,681,608	5,762	1,365	7,126
1989	6,302,703	5,926	3,286	9,212
1990	4,456,791	6,275	1,139	7,414[a]
1991	3,094,817	6,991	3,853[b]	10,844
1992	4,529,573	c	c	c

Note: Red meat exports and promotion expenditures include fresh, chilled, frozen, or otherwise processed beef, veal, pork, lamb, and variety meats. Wheat exports and promotion expenditures include wheat, wheat flour, and wheat products.

a Total may not add due to the inclusion of the dummy country category which is not listed as a separate category here.

b The 1991 figure includes both TEA and MPP expenditures.

c 1992 data are not available.

Sources: Based on program data provided by FAS, USDA (April 5, 1989 and March 11, 1992); and US Bureau of the Census data provided by FAS, USDA.

Table IIA. FAS Cooperator Market Development Program Expenditures for Red Meats and Wheat by Region (in Thousand Dollars), Fiscal 1986 - 1991.

Red Meats

Year	Pacific Rim	Western Europe	Latin America	Middle East	Africa	Eastern Europe	North America	Total
1986	787 (53.7%)[a]	385 (26.3%)	125 (8.5%)	124 (8.5%)	35 (2.4%)	2 (0.1%)	7 (0.5%)	1,465 (100%)
1987	563 (49.1%)	285 (24.8%)	110 (9.6%)	104 (9.1%)	75 (6.5%)	0 (0%)	10 (0.9%)	1,147 (100%)
1988	1,004 (62.6%)	294 (18.3%)	154 (9.6%)	88 (5.5%)	60 (3.8%)	0 (0%)	2 (0.1%)	1,603 (100%)
1989	1,063 (65.7%)	260 (16.1%)	160 (9.9%)	87 (5.4%)	25 (1.6%)	0 (0%)	0 (0%)	1,619 (100%)[b]
1990	693 (55.9%)	98 (7.9%)	69 (5.5%)	0 (0%)	0 (0%)	23 (1.9%)	0 (0%)	1,240 (100%)[b]
1991	848 (55.5%)	400 (26.2%)	206 (13.5%)	12 (0.8%)	14 (0.9%)	47 (3.1%)	0 (0%)	1,528 (100%)
Total	4,958 [57.6%][c]	1,722 [20%]	824 [9.6%]	417 [4.5%]	209 [2.4%]	72 [0.8%]	19 [0.2%]	8,601 [100%][b]

Wheat

Year	Pacific Rim	Western Europe	Latin America	Middle East	Africa	Eastern Europe	North America	Total
1986	2,413 (42.7%)	284 (5.0%)	1,033 (18.3%)	964 (17.0%)	627 (11.1%)	335 (5.9%)	0 (0%)	5,656 (100%)
1987	2,008 (40.4%)	281 (5.7%)	956 (19.3%)	805 (16.2%)	683 (13.8%)	229 (4.6%)	0 (0%)	4,962 (100%)
1988	2,266 (39.3%)	338 (5.8%)	1,012 (17.6%)	801 (13.9%)	918 (16.0%)	427 (7.4%)	0 (0%)	5,762 (100%)
1989	2,272 (38.3%)	299 (5.0%)	982 (16.5%)	944 (16.0%)	944 (16.0%)	485 (8.2%)	0 (0%)	5,926 (100%)
1990	1,771 (53.9%)	21 (0.6%)	456 (13.9%)	501 (15.3%)	321 (9.8%)	212 (6.5%)	0 (0%)	3,282 (100%)[b]
1991	2,666 (38.1%)	274 (4.0%)	1,281 (18.3%)	903 (12.9%)	1,438 (20.6%)	428 (6.1%)	0 (0%)	6,990 (100%)[d]
Total	13,396 [41.2%]	1,497 [4.6%]	5,720 [17.5%]	4,938 [15.1%]	4,931 [15.1%]	2,116 [6.5%]	0 [0%]	32,598 [100%][b]

[a] Figures in parentheses represent the percentage of total market development expenditures allocated to each region in individual years.

[b] Total does not add due to the inclusion of expenditures under the dummy country category which is not listed separately here. The dummy country category for red meats accounted for $23,324 under the Cooperator Program in 1989 and $357,638 in 1990. The dummy country category for wheat accounted for $3 million in 1990. Refer to the text for the description of the dummy country.

[c] Figures in brackets represent the percentage of total market development expenditures allocated to each region during the 1986-1991 period.

[d] 1991 is the only year which includes both TEA and MPP expenditures.

Source: Based on data provided by FAS, USDA, (April 5, 1989 and March 11, 1992).

Table IIB. FAS Targeted Export Assistance Program/Market Promotion Program Expenditures for Red Meats and Wheat by Region (in Thousand Dollars), Fiscal 1986 - 1991.

Red Meats

Year	Pacific Rim	Western Europe	Latin America	Middle East	Africa	Eastern Europe	North America	Total
1986	6,846 (100.0%)	0 (0.0%)	0 (0%)	0 (0.0%)	0 (0.0%)	0 (0%)	0 (0%)	6,846 (100.0%)
1987	0 (0.0%)	0 (0.0%)	0 (0%)	0 (0.0%)	0 (0.0%)	0 (0%)	0 (0%)	0 (0.0%)
1988	9,548 (89.7%)	421 (4.0%)	159 (1.5%)	390 (3.7%)	95 (0.9%)	0 (0%)	36 (0.3%)	10,650 (100.0%)
1989	5,341 (79.0%)	737 (10.9%)	298 (4.4%)	333 (4.9%)	52 (0.8%)	0 (0%)	0 (0%)	6,771 (100.0%)
1990	3,965 (57.0%)	105 (1.5%)	293 (4.2%)	35 (0.5%)	8 (0.1%)	0 (0%)	0 (0%)	6,963 (95.7%)[b]
1991	8,346 (91.1%)	284 (3.1%)	502 (5.5%)	301 (.04%)	31 (0.3%)	0 (0%)	0 (0%)	9,164 (100.0%)[d]
Total	34,057 [84.3%]	1,547 [3.8%]	1,252 [3.1%]	759 [1.9%]	185 [0.5%]	0 [0%]	36 [0.1%]	40,393 [100.0%][b]

Wheat

Year	Pacific Rim	Western Europe	Latin America	Middle East	Africa	Eastern Europe	North America	Total
1986	104 (9.8%)	0 (0%)	432 (40.6%)	215 (20.2%)	313 (29.4%)	0 (0.0%)	0 (0%)	1,064 (100%)
1987	125 (100.0%)	0 (0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0%)	125 (100%)
1988	853 (62.6%)	0 (0%)	25 (1.8%)	6 (0.4%)	441 (32.3%)	39 (2.9%)	0 (0%)	1,364 (100%)
1989	1,137 (34.6%)	0 (0%)	211 (6.4%)	0 (0.0%)	1,938 (59.0%)	0 (0.0%)	0 (0%)	3,286 (100%)
1990	333 (32.9%)	5 (0.5%)	34 (3.3%)	119 (11.8%)	410 (40.6%)	110 (10.9%)	0 (0%)	1,011 (100%)[b]
1991	771 (20.0%)	34 (0.9%)	282 (7.3%)	55 (1.4%)	2,456 (63.8%)	255 (6.6%)	0 (0%)	3,853 (100%)[d]
Total	3,323 [31.0%]	39 [0.4%]	984 [9.2%]	395 [3.7%]	5,558 [51.9%]	404 [3.8%]	0 [0%]	10,703 [100%][b]

[a] Figures in parentheses represent the percentage of total market development expenditures allocated to each region in individual years.

[b] Total does not add due to the inclusion of expenditures under the dummy country category which is not listed separately here. The dummy country for red meats accounted for $2.6 million under the TEA Program in 1989 and the dummy country for wheat accounted for $129,534 under MPP in 1990. Refer to the text for the description of the dummy country.

[c] Figures in brackets represent the percentage of total market development expenditures allocated to each region during the 1986-1991 period.

[d] 1991 is the only year which includes both TEA and MPP expenditures.

Source: Based on data provided by FAS, USDA, (April 5, 1989 and March 11, 1992).

PAPER II

THE EFFECTIVENESS OF U.S. NON-PRICE PROMOTION PROGRAMS FOR HIGH-VALUE PRODUCTS: THE CASE OF ALMONDS IN THE PACIFIC RIM

INTRODUCTION

The U.S. government's financial involvement in the promotion of agricultural exports has been an issue of growing debate in recent years. Although the federal government has assisted the U.S. agricultural sector in expanding sales of agricultural products to foreign markets for nearly four decades, the tightening of the federal budget during the 1990s and the dramatic increase in public funding for export promotion which occurred during the 1980s has raised concerns about the effectiveness of the federal promotion programs. Since most of the increased funding for promotions has been directed toward high-value consumer food products (USGAO, August 1993), federal export promotion of U.S. almonds in the Pacific Rim is used as a case study to analyze the effectiveness of the government's non-price promotion programs for high-value products.

Blue Diamond Growers is one of eleven almond growers cooperatives and/or companies which have received support for marketing activities from programs administered by USDA's Foreign Agricultural Service (FAS). FAS currently coordinates two promotion programs for tree nuts: the Foreign Market Development (FMD) Program and the Market Promotion Program (MPP), which replaced the Targeted Export Assistance (TEA) Program in 1991. While the FMD Program dates

back to the 1970s, the TEA Program was only recently initiated in 1986. From 1986 to 1992, TEA/MPP expenditures for almonds in the Pacific Rim totaled nearly $20 million (Table 1). Almonds have historically accounted for the largest percentage of U.S. tree nut exports to the Pacific Rim as well as the majority of federal promotions for tree nuts in the region.

Although agricultural products receive the bulk of federal export assistance (USGAO, August 1992), FAS has not established a solid method for evaluating the effectiveness of promotion expenditures. During the past several years, MPP has come under fire from members of Congress, the media, and taxpayers with criticisms that the federal government is helping large U.S. companies, such as Blue Diamond, promote their products overseas (USGAO, May 1992). Because FAS has not been able to respond to these criticisms with analysis of MPP's effectiveness, Congressional funding for the $200 million program has already been reduced to $148 million for fiscal 1994 and further reductions have been discussed (BDG 1992).

The promotion of U.S. agricultural exports could be vital for U.S. competitiveness. However, without evaluation, the demise of these programs cannot be justified by their opponents nor opposed by their supporters. More specifically, the absence of the evaluation of the effectiveness of past programs for almonds leaves future funding uncertain for potential U.S. exports, such as pecans and other high-value agricultural crops produced in the southern and western United States which are less mature in terms of import demand and market promotion. With the recent establishment of a federal marketing order and reorganization of a national marketing council (Charlet and Henneberry), pecans are in a particularly strong position to begin promotion in the Pacific Rim with the federal government's assistance.

The primary objective of this study is to evaluate the effectiveness of the U.S. government's non-price export promotion programs for almonds in the Pacific Rim markets of Japan, South Korea, Taiwan, Hong Kong, and Singapore. A secondary objective is to determine what implications there are for federal promotion of U.S. pecans in the region based on the effectiveness of almond promotions. This is the first public study to focus exclusively on the demand for almonds in the Pacific Rim in order to evaluate the effectiveness of the federal government's non-price promotion programs.

First, an overview of trade and market development for almonds in the region is provided. This is followed by a discussion of the theoretical framework for the specification and estimation of the import demand model. In the next section, results of the empirical estimation are given and the government's return on investment of the promotion of almonds in the Pacific Rim is determined. Finally, policy implications are discussed with respect to almonds, pecans, and other high-value agricultural products.

PACIFIC RIM ALMOND MARKETS

Almonds have been an enormous export success for high-value U.S. agriculture. Not only is the United States both the world's largest producer and exporter of almonds (Tse 1992), but demand in foreign markets has fueled much of the growth of the U.S. industry over the last several decades. Traditionally, at least half of U.S. utilized almond production has been exported (USDA, September 1992a).

While the European Community (EC) is the world's second largest exporter of almonds, usually at least half of U.S. almond exports have been imported by the EC.

The Pacific Rim is the United States' second largest regional market for almond exports. Between 1986 and 1992, U.S. exports of almonds to Japan, South Korea, Taiwan, Hong Kong, and Singapore totaled $740 million or roughly 20 percent of U.S. almond exports to the world (Figure 1). Actually, Japan accounted for three-quarters of this total and ranks as the second-largest single market for U.S. almonds next to the EC.

U.S. Trade in the Region

The United States has gained a reputation as a reliable supplier of quality, price competitive almonds in the Pacific Rim and other markets throughout the world. This is evidenced by the dominant market share held by U.S. almonds relative to the EC product in many Pacific Rim countries. During the 1986-92 period, the United States accounted for more than 90 percent of Taiwan and Singapore's almond imports and approximately 100 percent of almond imports in Japan and Korea (Table I). U.S. market share has been much lower in Hong Kong due to significant competition from China (Hong Kong Census and Statistics Department). Trade barriers have also been minimal for almonds in these markets (USATO 1991). While the United States' closer proximity to the Pacific Rim may have given U.S. producers some advantage over European exporters, it is reported that the EC even has difficulty competing with the United States in European markets on quality and price points (Tse 1992). EC almonds, produced mainly by Spain and Italy, suffer from inconsistent crop yields and volatile prices due to the production inefficiencies of many smaller growers.

While not the case for Pacific Rim almond imports, competition is intense between the United States and the EC for many other high-value-product exports to the region (Woolsey and Halliburton). Japan and the newly industrialized countries of

Korea, Taiwan, Hong Kong, and Singapore have led Asia's ascent to the largest regional market for total U.S. agricultural exports with greater importation of numerous high-value consumer food products (Giordano and Landes). These countries have all experienced substantial growth in per capita incomes since the 1970s. This increase in consumer purchasing power has provided the backdrop for the development of tastes and preferences toward many American foods and Western eating habits (Tse 1993).

Japan has been a particularly strong import market for almonds during the past two decades. Since 1970, the volume of Japan's almond imports has risen more than fourfold and the value more than tenfold (FAO). In recent years, however, growth has begun to slow and U.S. almond exports to Japan appear to have leveled-off (Figure 1). At the same time, imports of almonds by other East Asian and Southeast Asian countries have begun to take-off. U.S. almond exports to Korea ($18.9 million) and Hong Kong ($8.6 million) have grown approximately 700 percent since 1986. Taiwan, now an $8.2 million market for U.S. almond exports, and Singapore, a $3.6 million market, have both fallen slightly from peaks they reached in the late 1980s. Corresponding promotional funding levels for these markets are shown in Figure II.

While medium-scale promotion expenditures have taken place in the growing import markets of South Korea, Taiwan, and Hong Kong, the stagnation of Japanese almond imports has coincided with the largest funding levels for federal promotion of almonds in the history of the Pacific Rim region. As shown in Figure 3, this could imply that the Japanese import market for almonds has matured and the only remaining effect of promotions is to sustain demand. However, the continued growth

of import demand for U.S. almonds in other Pacific Rim countries indicates that these export markets are still in the growth stages of their life cycles. Based on this criteria, almond promotions may continue to expand demand in South Korea, Taiwan, Hong Kong, and Singapore. The could be especially true for Singapore since previous export promotion funding has been on such a small scale relative to the other four Pacific Rim countries.

A hypothetical scenario for the product life cycles of Japanese imports of other U.S. tree nuts is also described in Figure 3. Although more promotion money has been expended on walnuts in Japan than has been on almonds, Japanese imports of walnuts apparently have not yet reached full maturity. At the same time, Japan's imports of pistachios and pecans are still at relatively early stages in their product life cycles. While the level of promotional funding for both of these nuts has been far less than for walnuts and almonds, promotions for pistachios have been far greater than those for pecans. The slower growth and smaller volume of pecan exports to Japan and other Pacific Rim markets may be associated with the markedly lower levels of promotion program funding received by pecans relative to almonds, walnuts, and pistachios.

Marketing Institutions

Many factors which are difficult to explain with traditional economic variables, such as cultural considerations and tastes and preferences are likely to have influenced the development of almond markets in the Pacific Rim. For example, nuts are a larger part of Asian diets compared to those in the United States, both because of nutritional factors as well as cultural traditions. Not only are nuts consumed during holidays and after work in bar settings in Japan, but even the Japanese government

now includes almonds in its school lunch program (Tse 1992). In addition, a number of successful marketing strategies, often conducted jointly between U.S. companies and domestic country interests, are also likely to have contributed to the development of these markets. Since many of these strategies, such as market segmentation, distribution agreements, and product innovation, were initially used in Japan, their application to other Pacific Rim markets is likely to have lowered the marginal entry cost for U.S. almond producers in the region.

Almond demand in most countries has been driven by two market segments--institutional and retail. In the institutional segment, bulk almonds are imported by food manufacturers for use as inputs in ice cream, confectionery, and bakery products. Chocolate manufacturing reportedly accounts for nearly half of Japanese almond consumption (JETRO) and is assumed to represent a similar percentage in the other countries. While chocolate products, such as candy bars, are also imported already containing nuts, Japan, Korea, and Taiwan all have developed large processed food and bakery industries which account for the majority of almond imports from the United States (USATO 1993). Almonds have also been introduced as a snack nut in the retail market segment. The promotion of almonds at this level has emphasized health and/or convenience characteristics of the nut.

U.S. snack foods, in general, have enjoyed a growing acceptance among Asian consumers (Tse 1993). In fact, all snack foods in these markets, even french fries, compete with one another to some extent. The same can be said for tree nuts. However, information on the relationships between almonds, walnuts, cashews, pistachios, chestnuts, brazil nuts, hazelnuts, macadamia nuts, and pecans is limited. An attempt was made in the 1970s to estimate the interrelated demands for peanuts

and tree nuts at the wholesale level in the United States (Dhaliwal), but results concerning almonds were generally inconclusive. Although the study was able to conclude that pecans and walnuts, pecans and brazil nuts, and brazil nuts and cashews behaved as substitutes, no relationships between almonds and these nuts were confirmed. In both the institutional and snack nut segments of the Pacific Rim markets, walnuts, cashews, pistachios, and pecans are the tree nuts assumed to most likely behave as substitutes for almonds (USATO 1991). However, these nuts could also hold complementary relationships when, for example, different types of snack nuts are mixed together or used together in manufactured items.

The distribution system is another major factor affecting almond demand in Pacific Rim countries, especially Japan. Blue Diamond, the principal U.S. producer of almonds and dominant exporter worldwide, distributes almonds in Japan through an agreement with Coca-Cola (BDG 1993). Coca-Cola and other soft drinks and alcoholic beverages have the potential to become strong complementary products for almonds and other consumer snack foods in many countries. The agreement has been especially important for increasing availability and consumer awareness of branded almonds throughout Japan. The high use of vending machines and growing need for convenience in Asian lifestyles, particularly in Japan, is also likely to have contributed to the demand for western-style candy bars and other Asian-style processed food products containing nuts.

Product innovation has also been used to integrate the almond into the Asian culture. Japan's highly innovative food manufacturing industry has played a particularly important role in satisfying consumer demand in that country. The flexibility of the almond has allowed it to be used in hundreds of new food products

introduced to the Japanese consumer in recent years. For example, instead of a standardized global approach to Blue Diamond's marketing of snack almonds, the product was tailored for the Japanese market through the creation of slivered almonds flavored with baby sardines (BDG 1993). Also, traditional Asian dishes have been expanded to include almonds, as well as new recipes developed for almonds to accommodate traditional cooking styles.

REVIEW OF PAST RESEARCH

Relatively few studies have attempted to assess the effect of U.S. export promotion on import demand. The limited number of promotion studies that do exist have focused on only a handful of agricultural commodities and products in various markets. While the effect of promotions on import demand for U.S. almonds in the Pacific Rim has not been addressed by previous research, a few broader-based import demand studies have dealt with almonds and other tree nuts in a variety of markets, including Japan.

The majority of research on promotion has related promotion expenditures to exports through econometric analysis of single-equation import demand models (Henneberry and Ackerman). Single equations were used to measure the effect of FMD Program expenditures on U.S. exports of apples, poultry, and tobacco (Rosson, Hammig, and Jones). However, in this case time-series data was pooled for several regions. The study concluded that while promotions had a positive impact on exports of apples and tobacco to various regions, the estimation for poultry was not significant. On the other hand, a system of demand equations was used by Jones and Ward in their analysis of domestic consumption of processed potato products, as well

as by Lee and Fairchild in their study of the relationship between exchange rates and U.S. grapefruit exports.

Regardless of the type of equation used, the choice of functional form and lag effects of promotions have also been common considerations. A semi-log function has been used to determine the effects of promotions for U.S. orange juice in various European countries (Lee and Brown 1986). The semi-log functional form implies that at some point, the marginal rate of return on promotion expenditures will eventually decline and even become zero as promotions increase. Lee and Brown found promotions to be more effective than price reductions in increasing imports of orange juice. Diminishing returns to promotions or the "decay" of promotions is a generally accepted concept, especially when considering the maturity level of a market's demand for imports.

Lag effects of promotions suggest that the promotions conducted in a previous period affect demand in the current period. This carry-over effect has been tested in much of the previous research on promotions and found in many cases to have a significant affect on demand (Lee and Brown 1986; Solomon and Kinnucan). However, the structure of the lag has not always been the same (Lee and Brown 1992). Lag effects were incorporated in the Rosson, Hammig, and Jones study by using a weighted average of current and lagged promotion expenditures to measure the impact on exports,

The dependent variable may also be lagged and used as an independent variable, as well as the lag of other independent variables, such as prices. A lagged dependent variable represents a behavior known as the habit effect in which purchases in the current period are dependent on those in previous periods (Bushnell and King). An

analysis of single equation aggregate import demand models for five countries, including Japan, found dynamic models using a lagged dependent variable to be more accepted than other lagged models or static ones (Thursby and Thursby).

While lag effects were ignored, a binary variable instead of traditional expenditures has been used in a single-equation model to test the impact of promotions in Japan for nine agricultural products (Dwyer and Flowers). This simplified approach concluded that the TEA Program had a positive impact on U.S. exports of walnuts. The model also showed demand for walnut imports in Japan to be income elastic, but price inelastic. This is consistent with the results of a study of the U.S. almond industry by Bushnell and King, which also concluded that demand for almonds in Japan was price inelastic.

Other studies concerning Pacific Rim markets have used more restrictive trade models. The Armington model was used to determine the U.S. market share for cotton and the marginal returns to promotion expenditures in six Pacific Rim countries (Solomon and Kinnucan). The promotion variable was found to be significant for Japan, South Korea, Hong Kong, and the Philippines. The lagged dependent variable also showed significance in three of the six countries. De Brito similarly used the Armington model to estimate the effect of U.S. red meat promotions in Japan. One advantage of the Armington model and other relative share models, such as AIDS and the Rotterdam model, is their distinction of commodities by origin of production (Armington). Through the assumptions of weak separability and homotheticity associated with two-step budgeting, these models also allow the researcher to increase the models' degrees of freedom by lowering the number of parameters to be estimated.

AIDS and Rotterdam offer further theoretical advantages by facilitating tests for the general restrictions of demand (Deaton and Muellbauer). The Rotterdam model has been used to estimate demand for U.S. apples in Hong Kong and Singapore (Sparks, Seale, and Buxton), as well as demand for U.S. grapefruit exports to Japan relative to competitive banana and pineapple imports (Lee, Seale, and Jierwiriyapant). Both the Rotterdam and AIDS models have commonly been used to study meat demand in the United States, separating the relationships among beef, chicken, and pork (Brester and Wohlgenant; Hayes, Wahl, and Williams). The studies utilizing two-stage budgeting and weak separability are becoming more popular because of their noted theoretical benefits and wide acceptance among researchers. While these models were considered for the estimation of almond demand in the Pacific Rim, the use of relative prices in the study of almonds is pointless since U.S. market share in the Pacific Rim is more than 90 percent in four of the five countries included in this analysis (Table I). Although outside the scope of this study, analysis of almond demand relative to the demand for other tree nuts or other snack foods in the Pacific Rim might have more meaning in the models that attempt to quantify factors affecting the relative share of competing exporting countries.

Failure to include competing country and commodity promotions may bias parametric estimates. However, if these promotions are not correlated with those of competitors, the results will be unbiased (De Brito). Even if U.S. almonds faced major competition in the region from other almond exporters, if U.S. promotion is not correlated with competing countries, the results will be unbiased. However, research has found that the failure to address the impact of promotions on substitute

and complement products in single equation models could bias results (Lee, Brown, and Fairchild).

Not only are competitors' promotions of almonds in the Pacific Rim region assumed to be negligible, but U.S. almond promotions are generally of a branded nature. The promotion of differentiated products and the relationship between generic and brand advertising has been analyzed at length (Goddard and Conboy; Ward, Chang, and Thompson; Johnson, Grennes, and Thursby). While Ward, Chang, and Thompson simply make generalizations about theoretical issues related to branded and generic promotions, Goddard and Conboy actually apply optimal advertising measures to one- and two-stage demand models. Just as branded promotions should create less of a free-rider problem than is usually associated with generic promotions, branded promotions have also been found to create higher barriers to entry for a market than would be created by generic promotions. Thus, branded almond promotions are likely to be more effective in reducing competition from competing country products (i.e., almonds, other tree nuts, or other snack foods).

The relationship between government promotions and the development of U.S. almond markets in the Pacific Rim has not been addressed by past literature. While Japanese import demand for U.S. almonds has been estimated for the period 1960 to 1980 (Bushnell and King), this specification did not include government promotion expenditures. Specifications of the import demand models across countries in the Bushnell and King report similarly included the per capita quantity of U.S. almonds as the dependent variable and the prices of U.S. almonds, competing nuts, and confectionery inputs (i.e., cocoa and sugar), as well as per capita income, and lagged per capita consumption of U.S. almonds as independent variables. The exchange rate

was built into these prices instead of being specified separately. The contribution to knowledge of the current almond study is the inclusion of promotion expenditures in an import demand specification for five Pacific Rim countries as a current and single-period lagged variable.

THE MODEL

This study hypothesizes that U.S. export promotion expenditures have had a positive impact on Pacific Rim almond imports. To test this hypothesis, an econometric model was developed for Pacific Rim import demand for almonds and was estimated using empirical data. Due to the limited number of observations available on the promotion variable for individual countries in the region, data was pooled for seven years (1986-1992) across five countries (Japan, South Korea, Taiwan, Hong Kong, and Singapore). Pooled cross-sectional time-series data has had limited use in promotion analysis (Rosson, Hammig, and Jones; Ward and McDonald). While this type of data is more difficult to deal with econometrically than time-series data alone, its limited use may also be due in part to the fact that FMD expenditures, which usually cover a longer time span than TEA/MPP, have traditionally been included in analyses of the government promotion programs.

Specification

Specification of the import demand model follows a traditional ad hoc approach where total quantity demanded is assumed to be a function of prices and income, as well as any other economic variables, such as promotions, which may explain variability in demand over time. Since lag effects are usually associated with advertising, a lagged promotion variable ($PROM_{t-1}$) was included with the current-

period promotion variable in some estimations. The general specification of the almond model is:

$$M_{ALM_{it}} = f\ (\ P_{ALM},\ P_{SB},\ P_{CMP},\ Y,\ PROM_t,\ PROM_{t-1},\ T,\ D_i,\ DS_i\ )$$

where promotion expenditures ($PROM_t$ and $PROM_{t-1}$), the price of substitute products (P_{SB}), income (Y), and time (T) are expected to be positively correlated with demand for almond imports ($M_{ALM\,it}$), while the price of almonds (P_{ALM}) and the price of complement products (P_{CMP}) are expected to be negatively correlated. Due to the limited categorization of the data used in this analysis, cashews and an aggregate of tree nuts other than almonds were specified as likely alternative substitute products for almonds, while confectionery sugar, cocoa butter, and chocolate/chocolate products are likely alternative complements. The prices of these products, later referred to in the estimation results are denoted by P_{CSH}, P_{NTS}, P_{SUG}, P_{COC}, P_{CHC}, respectively. The lagged dependent variable ($M_{ALM\,t-1}$), representing consumers' habit of consuming almonds, was also considered as an alternative to the lagged promotion variable to reflect dynamic behavior in the model.

Intercept and slope promotion dummy variables were incorporated in the model to differentiate the intercept and the effect of promotions by country. Four intercept dummy variables (D_i) and four slope dummy variables (DS_i) were specified for Japan, South Korea, Taiwan, and Hong Kong, respectively. Slope dummy variables will be referred to as promotion dummy variables from this point forward. Singapore was specified as the base country. Therefore, the model's overall intercept represents its intercept and the model's promotion coefficient represents the coefficient for Singapore. The procedure used to calculate the intercept and promotion coefficients

from the intercept and promotion dummy variable parameters is explained in the Appendix.

Data

Cross-sectional time-series data from several secondary sources were applied to the model. Promotion expenditures were provided by the USDA Foreign Agricultural Service. Actual expenditures were used for 1986 through 1990. Budgets were used for 1991 and 1992 due to the delay of companies and cooperators in reporting actual expenditures to FAS. Due to the limited categorization of the data by FAS, only FAS' portion of the programs' expenditures for almonds were available for each country, individually. Therefore, these amounts do not include program participants' second-party contributions or expenditures made by foreign third-parties in the importing countries. Program participants are expected to provide matching funds equivalent to the government's investment. This may imply that the magnitude of the total promotion expenditures for almonds are proportional to the FAS share used in the regression. If that is the case, the estimated coefficients for promotion are unbiased. For a more detailed description of the FAS promotion programs and data, refer to Henneberry et al.

Data for all unit-value import prices and the volume of almond imports in each country were provided by the Food and Agricultural Organization of the United Nations (FAO). Nominal Gross Domestic Product (GDP) and exchange rates for Japan, Korea, and Singapore were collected from the International Monetary Fund (IMF). The same data for Hong Kong and Taiwan were obtained from the USDA Economic Research Service (USDA, September 1992b).

Several steps were taken to transform the pooled data to account for differences in currency and inflation across the five countries. First, nominal GDP was converted from each country's currency, as reported by the IMF, to nominal U.S. dollars using the market exchange rate for each year. Second, promotion expenditures, nominal GDP, and import prices were converted from nominal U.S. dollars, as reported by FAS and FAO, to a nominal Pacific Rim currency unit using a nominal trade-weighted exchange rate index complied by the USDA Economic Research Service (USDA, October 1993). This index is weighted by each country's agricultural imports from the United States. Finally, prices, income and promotion in Pacific Rim currency were adjusted for inflation. A detailed description of the procedure used to make inflation adjustments is located in the Appendix. By removing the effect of each country's domestic inflation as well as the effect of inflation on the Pacific Rim exchange rate from the data, the regression parameters more closely reflect the impact of the prices, income, and promotion on consumers' demand for almond imports.

While the specification of the model's explanatory variables discussed previously follows economic theory, functional forms were also specified to characterize the particular behavior of the transformed data. Although the model is linear in the parameters estimated, the data used to estimate the model is not required to be linear. Therefore, a functional form most consistent with the data's behavior should be applied. In this case, three functional forms were considered--the Cobb-Douglas, the

linear, and the exponential.[1] The Cobb-Douglas and linear forms are the most common forms used to estimate import demand (Boylan, Cuddy, and O'Muircheartaigh; Khan and Ross). The exponential function implies that each additional dollar spent on promotions has a greater impact on import demand than the previous dollar spent. This behavior is particularly applicable to immature almond markets which account for four of the five export markets analyzed in this study.

Method of Pooling

The almond import demand model was estimated using Kamenta's method for pooling cross-section time-series data. Based on the nature of this data, the Kamenta pooling model is assumed to be a cross-sectionally heteroskedastic and time-wise autoregressive model (Kamenta). Thus, the assumption of autoregression, which is usually associated with time-series data, is combined with the assumption of heteroskedasticity, which is usually associated with cross-sectional data. Through its generalized least squares procedure, the Kamenta model is designed to correct for the effects of these assumptions. The variance of the disturbance term is also likely to be non-constant for the cross-sectional data used in this analysis due to the different income sizes of the five countries. For example, because Japan has a much higher income level than the other four countries, the level of consumption in Japan is likely to be more variable.

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[1] The Cobb-Douglas form, also known as the double-log form, involves the natural log of the dependent and independent variables, and the resulting estimated regression coefficients are elasticities. These elasticities are constant, meaning that the percentage change in the dependent variable is caused by a proportional percentage change in the independent variables. In the exponential form, the natural log is taken only of the dependent variable, whereas none of the variables are logged in the linear form. Elasticities in the latter forms are not constant as in the case of the Cobb-Douglas. Rather, the change in the expected value of the dependent variable depends on the particular units of the independent variables. The procedure for calculating price, income, and promotion elasticities from the estimated regression coefficients of the linear and exponential forms of the model is outlined in the Appendix.

A third assumption of the model was conformed to the particular behavioral aspects of this analysis. Besides the presence of autocorrelation within each country over the time period, it is assumed that the error terms of each cross-section are also correlated with those of other cross-sections over time. This implies that factors affecting almond demand which are not specifically accounted for in the model are common to each country in the analysis. This is a reasonable assumption considering the five countries' similarities in geography, culture, and economic growth. Since Seemingly Unrelated Regression (SUR) also assumes cross-sectional heteroskedasticity, time-wise autoregression, and a contemporaneous correlation between the disturbances of the cross-sections, it was also considered as a potential estimation method (Lee and Fairchild). By improving the efficiency of the estimator, the SUR method offers a theoretical advantage over Kamenta's approach through its isolation of the effect of promotions in each country by means of a system of separate demand equations for each cross-section (Griffiths, Hill, and Judge). Unfortunately, because this increases the number of parameters and lowers the degrees of freedom of the estimation, SUR could not be used to estimate the almond model with only seven observations in each country. The error components model for pooling was considered as well, but it too requires more data observations than were available in this study (Griffiths, Hill, and Judge). Therefore, the Kamenta method's accommodation of the almond data limitations and provision for an acceptable number of degrees of freedom deemed it the most appropriate estimation method for this particular analysis.

The estimated almond model in the Cobb-Douglas, linear, and exponential forms is shown in equations (1), (2), and (3), respectively.

$$\ln M_{ALM_{i,t}} = \hat{\beta}_{0_{i,t}} \ln P_{ALM_{i,t}} + \hat{\beta}_{1_{i,t}} \ln P_{SB_{i,t}} + \hat{\beta}_{2_{i,t}} \ln P_{CMP_{i,t}} + \hat{\beta}_{3_{i,t}} \ln Y_{i,t} + \hat{\beta}_{4_{i,t}} \ln PROM_{i,t}$$

(1)

$$+ \hat{\beta}_{5_{i,t}} \ln PROM_{i,t-1} + \hat{\beta}_{6_{i,t}} \ln T_{i,t} + \sum_{j=1}^{4} \hat{\beta}_{7,j} D_{j_{jt}} + \sum_{k=1}^{4} \hat{\beta}_{8,k} DS_{k_{kt}} + \epsilon_{i,t}$$

$$M_{ALM_{i,t}} = \hat{\beta}_{0_{i,t}} P_{ALM_{i,t}} + \hat{\beta}_{1_{i,t}} P_{SB_{i,t}} + \hat{\beta}_{2_{i,t}} P_{CMP_{i,t}} + \hat{\beta}_{3_{i,t}} Y_{i,t} + \hat{\beta}_{4_{i,t}} PROM_{i,t}$$

(2)

$$+ \hat{\beta}_{5_{i,t}} PROM_{i,t-1} + \hat{\beta}_{6_{i,t}} T_{i,t} + \sum_{j=1}^{4} \hat{\beta}_{7,j} D_{j_{jt}} + \sum_{k=1}^{4} \hat{\beta}_{8,k} DS_{k_{kt}} + \epsilon_{i,t}$$

$$\ln M_{ALM_{i,t}} = \hat{\beta}_{0_{i,t}} P_{ALM_{i,t}} + \hat{\beta}_{1_{i,t}} P_{SB_{i,t}} + \hat{\beta}_{2_{i,t}} P_{CMP_{i,t}} + \hat{\beta}_{3_{i,t}} Y_{i,t} + \hat{\beta}_{4_{i,t}} PROM_{i,t}$$

(3)

$$+ \hat{\beta}_{5_{i,t}} PROM_{i,t-1} + \hat{\beta}_{6_{i,t}} T_{i,t} + \sum_{j=1}^{4} \hat{\beta}_{7,j} D_{j_{jt}} + \sum_{k=1}^{4} \hat{\beta}_{8,k} DS_{k_{kt}} + \epsilon_{i,t}$$

where

$M_{ALM\ i,t}$ is the total volume of almond imports in country i and year t in metric tons.

$P_{ALM\ i,t}$ is the unit-value import price of almonds in country i and year t in real Pacific Rim currency units per metric ton.

$P_{SB\ i,t}$ is the unit-value import price of an almond substitute in country i and year t in real Pacific Rim currency units per metric ton.

$P_{CMP\ i,t}$ is the unit-value import price of an almond complement in country i and year t in real Pacific Rim currency units per metric ton.

$Y_{i,t}$ is the total GDP in country i and year t in millions of real Pacific Rim currency units.

$T_{i,t}$ is a time trend (repeated for each cross-section) in country i and year t used to capture the effect of changing tastes and preferences or any other structural changes in each country over time.[2]

$PROM_{i,t}$ is the U.S. government export promotion expenditures for almonds in country i and year t in real Pacific Rim currency units.

$PROM_{i,t-1}$ is the U.S. government export promotion expenditures for almonds in country i and year t-1 in real Pacific Rim currency units.

$D_{j,t}$ is an intercept dummy variable for country j.

$DS_{k,t}$ is a slope dummy variable for promotion expenditures in country k.

A replacement procedure for the estimations was performed across alternative substitute and complement variables discussed previously, and the lagged volume of almond imports ($M_{ALM\ i,t-1}$) was also tested in place of the lagged promotion variable.

RESULTS

The parameter estimate results for equations (1) and (3) are shown in Table II. "A", "B", and "C" refer to subsets of equations (1) and (3) in which alternative specifications of the model were estimated in the Cobb-Douglas and exponential forms. Estimation of the linear model did not yield results consistent with economic theory, nor did the inclusion of the lagged dependent variable in any functional form of the model. Therefore, these results are not reported.

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[2] The starting value of the time trend variable will affect the estimation results. However, with the exception of the intercept term and the coefficient of the time trend, all coefficients converge to asymptotic values as the starting value of the time trend becomes sufficiently large. For the Cobb-Douglas form of the model, these asymptotic values of the coefficient can also be obtained if ln T is replaced by T. When T is used in place of ln T in the Cobb-Douglas versions, the starting value of the time trend will not affect the results. Therefore, in all Cobb-Douglas results presented in this study, the ln T was replaced by T.

Several consistencies of the Cobb-Douglas and exponential estimations are noted. First, the Buse R^2 for both sets of equations reported in Table II is high (0.97 and 0.99), indicating most of the variability in the dependent variable is explained by the independent variables. The price of almonds is consistently significant and of the expected sign in equations (1) and (3) of Table II, and the price of sugar was consistently found to be a significant substitute for almonds when specified in equations (1) and (3). While its sign was expected to be negative, indicating a complementary relationship to almonds, there are many confectionery and bakery products containing sugar which do not contain almonds, or any nuts for that matter, that may compete with the demand for almond products as a snack food. In the same way, negative signs on expected competing tree nuts could also indicate the use of nuts together as snack foods or in confections and bakery items. This could be the case for cashews when displaying significance at the 10-percent level as a complement in equation (3A) of Table II. However, none of the coefficients for the other tree nut variables were found to be significant. Finally, the time trend was also found to be significant at the one-percent level when used in equation (3A) in Table II.

Inconsistencies were indicated as well by the parameter estimations. In both equations (1A) and (1B) of Table II, income was found to be significant at the one-percent significance level. Based on these two estimations, income has had a significant impact on almond consumption in the Pacific Rim. However, the estimated coefficient for income was not found to be significantly different from zero in equations (3A), (3B), and (3C) of Table II. Analysis of the data indicated that income and promotion expenditures were both highly correlated with one another as well as with imports. Such a multicorrelation could account for the contradictory

results in the Cobb-Douglas and exponential forms of the model if it caused the effect of promotions to be diminished by income or vice-versa.

Equation (3C) of Table II was estimated for only six years of the seven-year time period for each country in the study. In this version of equation (3), promotion expenditures were lagged one year. However, the lagged variable showed no significant effect. Actually, the data itself provided an inherent three-month promotion lag in the static specifications because promotion expenditures were recorded on a fiscal year basis, while almond imports were recorded on a calendar year basis.

Price and income elasticities are reported in Table III. Pacific Rim demand for almond imports was shown to be highly own-price elastic or at least relatively less inelastic compared to the response of imports to promotions. Cashews are reported as a fairly inelastic complement to almonds, while sugar is shown both as a highly elastic and relatively inelastic substitute, depending on the model's specification. When significant, the model indicates that import demand for almonds in the region is slightly income inelastic. These results are markedly different from those found by past studies in the literature reviewed previously.

While the estimated parameters for the intercept and promotion dummy variables are shown in Table II, the intercept and promotion coefficients for each country, which are calculated from the intercept and promotion dummy variable parameters, are shown in Table AI, located in the Appendix. For an explanation of the procedure used to obtain these coefficients from the dummy variables and their use in the calculation of promotion elasticities also refer to the Appendix. The significance of the coefficients for the intercept dummy parameters in Table II indicates that a good

portion of the model's variability in the dependent variables can be explained by the differences in the country cross-sections.

As shown in Appendix Table AI, all of the intercept coefficients in equations (3A), (3B), and (3C) were found to be different from zero at the one-percent significance level. This indicates that each country would import almonds in the absence of promotions or when prices and other variables are set at zero. The statistical significance of a joint hypothesis test further supports this conclusion in its finding that each country's level of almond imports in the absence of promotion are significantly different from one another. However, these results are reputed by the findings of equations (1A) and (1B) in Table AI. No intercept coefficients were found to significantly different from zero in the Cobb-Douglas form of the model.

Elasticities of Promotion

Promotion elasticities for each country estimated from Tables II and AI are shown in Table III. As shown in Table AI, the promotion coefficients for Japan, South Korea, Hong Kong, and Singapore were not found to be significant. This implies that promotion expenditures did not have a significant impact on almond imports in any of these countries. While Taiwan's promotion coefficient was not found to be significant in equations (1A) and (3A), promotion expenditures in Taiwan were found to have a significant effect on Taiwan almond demand at the one-percent level in equations (3A), (3B), and (3C). The joint hypothesis test conducted to determine the significant difference of promotions between the countries in this version of the model supports the significant finding for Taiwan. An explanation of the joint hypothesis tests is footnoted in Table A1.

The promotion elasticities reported for Taiwan in Table III indicate an inelastic import response to promotions. Using this elasticity, the government's return on investment from the promotion of U.S. almond exports in Taiwan is calculated. The procedure for this calculation is shown in the Appendix. Based on the elasticities reported for equations (3A), (3B), and (3C) in Table III, the U.S. government received a return of $3.51, $8.59, and $4.64, respectively, for every dollar of promotions expended in the Taiwan almond market. These results indicate that use of the promotion programs in Taiwan generated more than a one-to-one return on investment.

CONCLUDING REMARKS

In retrospect, analysis of the U.S. government's non-price export promotion programs for almonds in the Pacific Rim has merely provided one snapshot of the whole export promotion picture. While obtaining the empirical results of the analysis was the primary objective of the study, these results are accompanied by an overview of past research, descriptions of the analysis methods used, and a summary of trade and market development in the region which also offer informational value. Clearly, the limited data available from the Foreign Agricultural Service on almond promotion program expenditures heavily influenced the scope of this research. However, although the cross-sectional analysis of such a short time period created econometric difficulties, a proper investigation of the government's most substantial outlays for export promotion for almonds and many other products should be restricted to the last seven years, and this is one of the first studies to do so.

The primary purpose of this study was to determine the effectiveness of the U.S. government's non-price promotion programs for almonds in the Pacific Rim. According to the model used in this analysis, the programs for almonds in the Pacific Rim region as a whole were found to be ineffective. However, while the empirical evidence specifically suggests that promotion expenditures in Japan, South Korea, Hong Kong, and Singapore were ineffective during the 1986-92 period, results concerning Taiwan were less conclusive. Based on the results of three versions of the estimated model, the government received a return ranging from $4 to $9 for every dollar of Targeted Export Assistance and Market Promotion Program expenditures spent in Taiwan. The high R^2s associated with these results indicate that the inclusion of any additional economic variables in the analysis would have provided little improvement in the model's explanatory power.

The ineffectiveness of promotions in the Japanese market may be explained by the maturity level of U.S. almond exports to that country as discussed previously and shown in Figure III. In the case of any product, if the marginal effect of the government's promotion efforts diminishes or a threshold point of sales is reached, it may signal that it is time for the government to turn the situation completely over to the private sector and move on to another product or market with greater potential. Thus, in order to maximize the use of promotion program funds, exports must be prioritized. TEA and MPP were not intended to sustain export markets, but rather to establish them. The private sector has the responsibility to maintain markets for its products.

On the other hand, it could be argued that the promotion programs were ineffective in Japan, South Korea, Hong Kong, and Singapore because the government

did not spend enough money on promotions in these markets. While this is not likely in Japan, it is a valid argument for Singapore. Promotion expenditures in Singapore over the time period of this analysis were less than one-percent of the amount in Japan. During the same time, Singapore's volume of almond imports was less than five percent of Japanese import volume. Ineffective allocation of funds to activities within the countries could also be blamed for the ineffectiveness. For example, the promotions in Japan or South Korea may have focused too heavily on processors and were not followed up at the retail level appropriately. Also, factors such as the variability of processors' buying cycles due to storage may not have been properly accounted for in the model.

Despite the noted discrepancies of the model's estimation results and the critical scrutiny they are likely to draw, this model did produce one undisputed result. In every case presented, the model consistently indicates a strong relationship between the price of almonds and the demand for almond imports. The same cannot be said for the non-price export promotion program expenditures. Several policy implications can be derived from this and other considerations.

POLICY IMPLICATIONS

Four broad policy implications are made from the results of this analysis: (1) increased use of export credit programs for almonds and other high-value products, (2) the combined use of export credit and non-price promotion programs for high-value products, (3) additional evaluation of the non-price promotion programs for almonds by more detailed market segments, and (4) the promotion of pecans in the Pacific Rim. All of these policy implications concern the direction of government

funding for export promotion. Obviously, if the price of almonds elicits a greater import response than the existing promotion programs, perhaps funds currently allocated to the non-price promotion programs should be shifted into price-related programs. While typical price mechanisms, such as subsidized transportation costs, could be applied to almond exports, a more novel concept currently being discussed by USDA is expanding the use of export credit programs, such as GSM 102 and 103, to include a greater number of high-value agricultural products. Traditionally, these programs have mainly been used for bulk grains, which have been declining in export importance (USGAO, August 1993).

The export credit programs could open the door for high-value consumer products earlier than it might otherwise be in lesser developed export markets, or existing markets could be expanded toward their full import potential in the short-run. This approach could be particularly effective for almonds and other tree nut exports in Korea, Singapore, and other lesser developed Southeast Asian countries which qualify for assistance. Without expanded use of the export credit programs, the United States might not only be losing years of potential market opportunities in countries such as Malaysia and Indonesia, but competitors of other U.S. high-value products are likely to enter the region during this time with similar programs of their own. Therefore, opportunities in the long-run are also likely to be diminished if loyalty to competitors' brands is established.

Since the GSM programs provide guaranteed loans for foreign importers desiring to purchase U.S. exports, the export financing risk is lowered for all parties--the lending institution, the foreign importers, and U.S. exporters. Because the U.S. government gives the importers up to three years under GSM-102 and up to ten years

under GSM-103 to repay the low interest loans, the importing country is not strapped by short-term debt (USGAO, August 1993), and given the growing economic strength of the Pacific Rim region, these countries are not likely to default on their loans.

The combination of export credit programs and the non-price promotion programs may actually prove to be a more viable policy option, depending on the target market's stage of import development. In this case, the export credit programs could be used as a first step in opening export markets by financially enabling the product to be imported. This could then be followed by more traditional non-price promotions to create more sustainable demand for the product. However, the duration of the involvement of the non-price programs would still need to be monitored.

A third policy area concerns the evaluation of the non-price promotion programs. The evaluation conducted in this analysis only measured the effect of the total promotion program expenditures on total imports. This macro analysis gives no evidence of the promotion programs' effectiveness in particular regions or cities of the importing countries. Demand is likely to be more segmented in countries with larger populations and more than one regional center, such as Japan or South Korea, while demand in Taiwan, Hong Kong, and Singapore is likely to be more homogeneous. One case in point: a limited amount of promotion funds spent in Tokyo's retail sector might have been effective in increasing demand for Blue Diamond's fish-flavored snack almonds, but other ineffective sectors throughout the country may mask these results at the macro level. Without knowing the exact details about the different types of promotions conducted in each country and the specific geographical and demographic segments of the markets, it is impossible to

unequivocally determine whether promotions were effective in the Pacific Rim. Obviously more detailed data collection is the first step to more detailed evaluation of the programs. The GAO has called for greater evaluation of the FAS promotion programs on numerous occasions (USGAO, July 1993). However, this may require a larger percentage of the program funding to be put into evaluation activities.

Finally, certain lessons for the promotion of U.S. pecans can be derived from the almond experience. The significant positive relationship found to exist between almond imports and promotion expenditures in Taiwan implies that branded promotions for pecans may also be an effective means for increasing Taiwan imports of U.S. pecans. In fact, promotion in Taiwan of other U.S. tree nuts, particularly pistachios, has increased in recent years. This could cause certain synergy effects if consumers are not yet discerning about what nuts they eat. For instance, although almond promotions have largely been for the Blue Diamond brand, the product is often generically known as a U.S. nut.

This implies that promoting multi-type nuts could drive demand up for all nuts more than it would have been otherwise for individual nuts. Furthermore, as the almond model results showed with cashews, nuts are not necessarily substitutes for one another, and the market entry costs should become lower for additional nuts. Thus, with these considerations and the recent momentum generated by a new federal marketing order for pecans, now may be an opportune time for new promotional efforts for pecans to begin in the Taiwan market. Moreover, coordination and cooperation with respect to promotions among the different U.S. tree nut industries could also prove successful for all U.S. tree nut exports.

APPENDIX

Procedure used for calculating promotion elasticities

The calculation of promotion elasticities from the slope dummy variables in the linear form is shown in equation (A4). The promotion coefficient for country k is obtained by adding the sum of the estimated coefficient of promotion in the base country to the estimated coefficient of the slope dummy variable for country k. This sum is then multiplied by the ratio of the average value of promotions in country k to the average of almond imports in country k to obtain the promotion elasticity for country k. Since Singapore is the base country, its promotion coefficient is used alone with its mean values of the dependent and independent variables to compute its elasticity of promotion.

(A4) $$E_k = (\hat{\beta}_4 + \sum_{k=1}^{4} \hat{\beta}_{7,k}) \cdot \frac{\overline{PROM}_k}{\overline{M}_{ALM_k}}$$

The calculation of promotion elasticities for the exponential form is shown in equation (A5). While the definition of an elasticity is the same for an exponential function as it is for a linear one, the change in the dependent variable with respect to the change in the independent variable for the exponential form involves the derivative of a logged value. As a result, the mean value of the dependent variable is not included in the denominator of the elasticity formula for the exponential form. However, the promotion coefficients are obtained in the same way as those in the linear form.

(A5) $$E_k = (\hat{\beta}_4 + \sum_{k=1}^{4} \hat{\beta}_{7,k}) \cdot \overline{PROM}_k$$

The intercept coefficients, shown in Table AI, are calculated the same as the promotion coefficients, regardless of the functional form. The estimated coefficient for each intercept dummy is added to the overall intercept coefficient, which is Singapore's intercept. Intercept elasticities are not calculated from the intercept coefficients since they have no useful economic interpretation.

Procedure used for calculating inflation adjusted variables

Inflation adjusted variables were obtained by applying the real appreciation of the Pacific Rim currency to promotion expenditures, income, and import prices in nominal Pacific Rim currency. As shown in equation (A6), calculation of the real appreciation of the Pacific Rim currency relative to the U.S. dollar is based on the rate of growth of inflation in the Pacific Rim relative to that in the United States (Paarlberg et al., p.71). A Pacific Rim CPI was created for this calculation by weighting the CPIs for Japan, Korea, Taiwan, Hong Kong, and Singapore by U.S. agricultural exports to each country.

(A6) $$Appreciation = \frac{PR\ currency\ per\ \$US_t}{PR\ currency\ per\ \$US_{t-1}} \cdot \frac{\frac{USCPI_t}{USCPI_{t-1}}}{\frac{PRCPI_t}{PRCPI_{t-1}}}$$

This formula yielded the real appreciation of the Pacific Rim currency in a percentage, which when greater than one reflects a higher rate of inflation in the Pacific Rim countries and when less than one reflects a higher rate of inflation in the

United States. This percentage was then multiplied by the region's nominal currency to obtain the deflated variables.

Procedure used for calculating returns to promotion

The government's marginal return per dollar of promotion expenditures is calculated according to equation (A7). The average marginal return on investment (ROI) in Taiwan is obtained by multiplying the ratio of total revenue for Taiwan (TR) and the average promotion expenditures in Taiwan by the promotion elasticity for Taiwan (E). As discussed in a previous section of the Appendix,

$$E = (\beta_4 + \beta_{8,3}) \cdot \overline{PROM}_3$$

where the average of promotion expenditures in Taiwan is multiplied by the promotion coefficient for Taiwan, $(\beta_4 + \beta_{8,3})$, as reported for equations (3A), (3B), and (3C) in Table (AI). To obtain total import revenue (TR), the average quantity of Taiwan almond imports over the observation period in that country is multiplied by the average real Pacific Rim currency price of Taiwan almond imports. However, before equation (A7) is calculated, both the average of promotion expenditures and the average price are converted from Pacific Rim currency units to U.S. dollars using the average real Pacific Rim trade-weighted exchange rate.

(A7)
$$ROI = \frac{\delta TR}{\delta E} = E \cdot \frac{TR}{\overline{PROM}_3} = E \cdot \frac{(\overline{M}_{ALM_3} \cdot \overline{P}_{ALM_3})}{\overline{PROM}_3}$$

The marginal return per dollar calculated at this point would overestimate the actual return since only the first-party FAS contributions are reflected in the

promotion variable. Assuming the FAS share accounts for one-third of total promotion expenditures from second and third parties as well, the initial ROI is divided by three to obtain the actual dollar return per dollar invested (De Brito).

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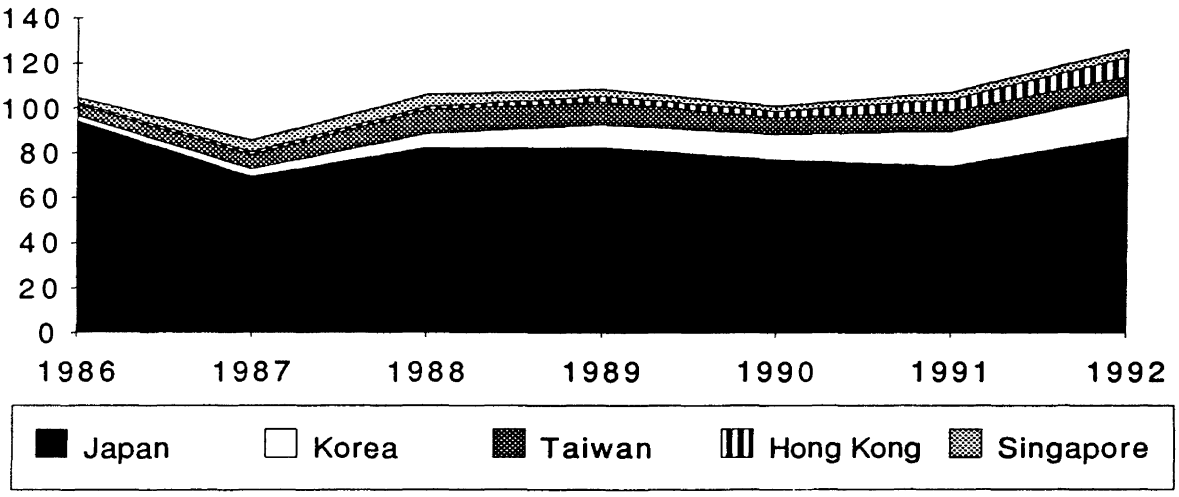
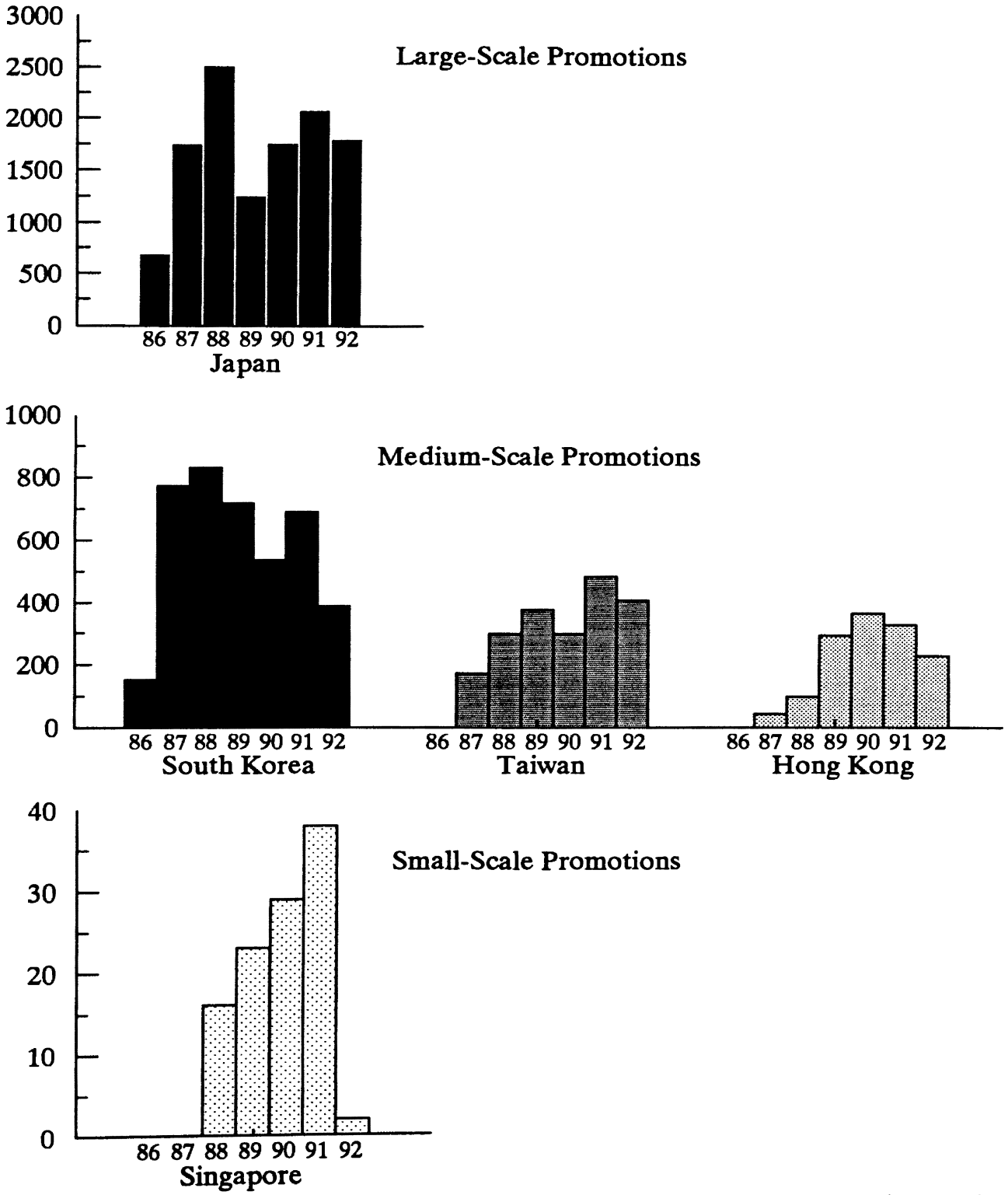
Figure 1. U.S. Almond Exports to the Pacific Rim (in Million Dollars), 1986-1992.



Source: Based on U.S. Bureau of the Census data provided by FAS, USDA.

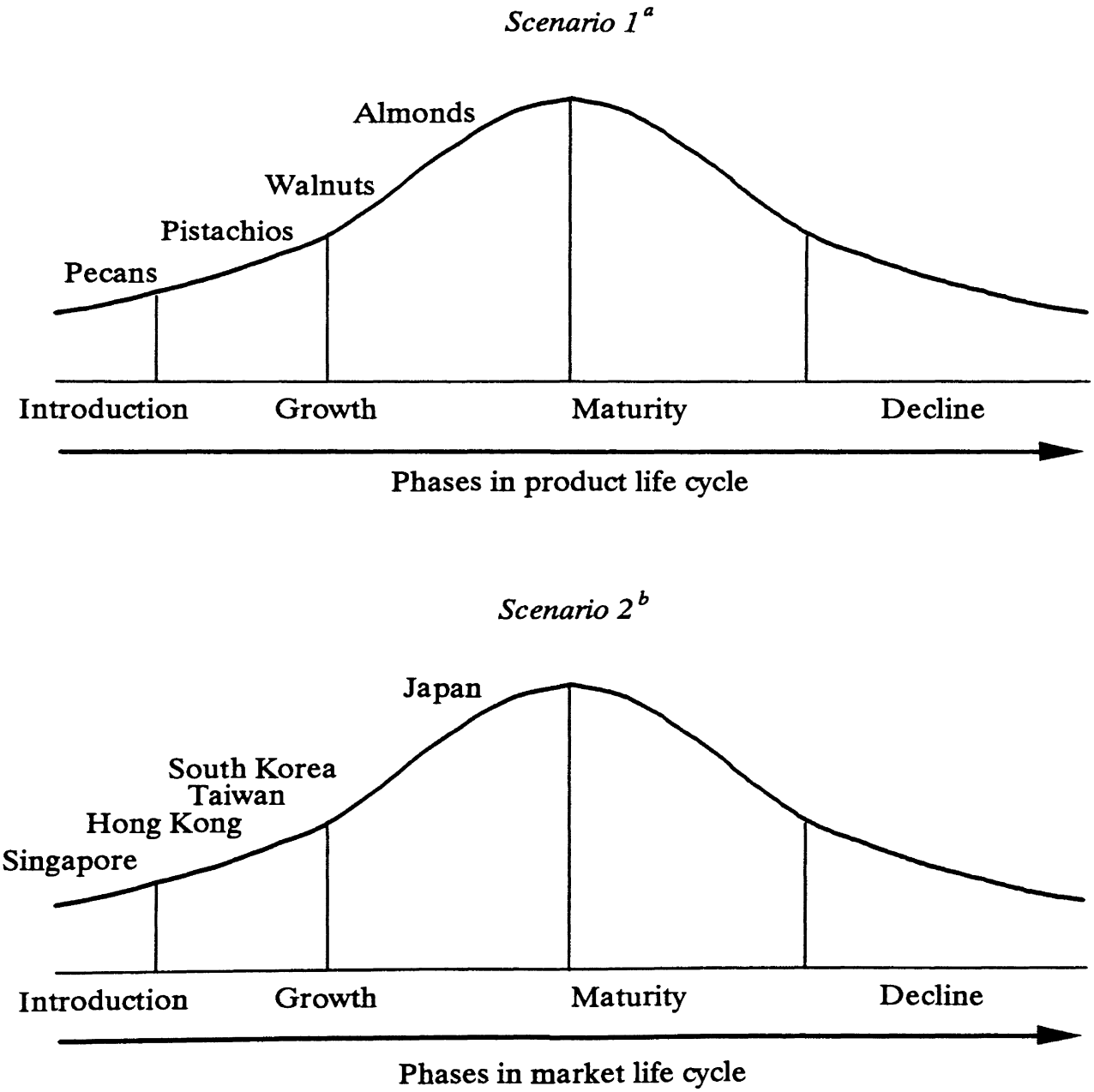
Figure 2. Distribution of U.S. Export Promotion Expenditures[a] for Almonds in the Pacific Rim (in Thousand Dollars), 1986-1992.



[a] Program budgets were used for 1991 and 1992 due to program participants' lags in reporting actual expenditures.

Source: Based on fiscal year program data provided by FAS, USDA (July 15, 1993).

Figure 3. Product and Market Life Cycle Models of U.S. Tree Nut Exports to the Pacific Rim, Hypothetical Scenarios.



[a] Japanese market for U.S. tree nut exports.

[b] U.S. almond exports to Pacific Rim markets.

Source: Based in part on John C. Mowen, *Consumer Behavior,* 2nd ed. New York: Macmillian Publishing Company, 1990, 482.

Table I. Pacific Rim Imports and U.S. Export Promotion Expenditures for Almonds (in Thousand Dollars), 1986 - 1992.

Import Market	Almond Imports	U.S. Market Share	Promotion Expenditures[a,b]
Japan	598,897	99.7%	11,899
South Korea	68,281	99.7%	4,105
Taiwan	60,668	97.8%	2,050
Hong Kong	36,828	46.9%	1,369
Singapore	27,684	91.5%	108
Total	*792,358*		*19,531*

[a] Program budgets were used for 1991 and 1992 due to program participants' lags in reporting actual expenditures.

[b] TEA and MPP account for all program expenditures and budgets between 1986 and 1992 for all countries, except for $14,000 spent in Japan in 1986 under FMD. Figures in this table reflect FMD,TEA, and MPP expenditures.

Sources: Promotion expenditures are based on fiscal year program data provided by FAS, USDA (July 15, 1993); Almond imports are calendar year FAO data provided by FAS, USDA; U.S. market share figures, with the exception of Singapore, are based on each country's commodity by country import statistics books published by the Japanese Ministry of Finance, Republic of Korea Office of Customs Administrations, Republic of China Inspectorate General of Customs, and Hong Kong Census and Statistics Department; U.S. market share in Singapore is calculated from U.S. export figures and FAO import data; U.S. Bureau of the Census export data provided by FAS, USDA.

Table 11. Parameter Estimation Results, Pacific Rim Almond Imports, Pooled Cross-Section Time-Series, 1986-1992.

	Cobb-Douglas		Exponential		
	Equation (1A)	**Equation (1B)**	**Equation (3A)**	**Equation (3B)**	**Equation (3C)**
Intercept	7.14 (1.601)	4.51 (0.9271)	-154.7*** (3.254)	7.578*** (31.96)	7.147*** (24.77)
P_{ALM}	-1.6915*** (7.051)	-1.694*** (6.679)	-0.4071E-5*** (6.278)	-0.2987E-5*** (6.041)	-0.668E-5*** (11.13)
P_{CSH}	-0.3426 (1.353)	--	-0.1207E-5* (2.068)	-0.1024E-5 (1.243)	-0.5478E-6 (0.9376)
P_{NTS}	--	0.024 (0.065)	--	--	--
P_{SUG}	0.9737*** (2.831)	0.8526** (2.340)	0.2587E-5** (2.635)	--	0.8451E-5*** (7.685)
P_{COC}	--	--	--	0.8462E-6 (0.9452)	--
Y	0.9243*** (6.052)	0.919*** (3.4)	0.2195E-8 (1.6970)	0.1014E-8 (1.22)	0.1325E-8 (0.9603)
T	--	--	0.08165*** (3.414)	--	--
$PROM_t$ [a]	-0.0501 (1.411)	-0.0471 (1.297)	-0.1166E-6 (1.088)	-0.1768E-7 (0.2345)	-0.7179E-7 (0.8996)
$PROM_{t-1}$	--	--	--	--	0.2595E-8 (1.769)
D_1 [b]	3.77 (1.321)	3.673 (1.171)	4.1687*** (12.22)	3.4194*** (12.52)	3.4111 (8.966)
D_2	-5.067 (1.676)	-6.563** (2.136)	1.054* (1.961)	1.2923** (2.352)	1.1108 (1.848)
D_3	-0.6129 (1.025)	-1.0815* (2.065)	0.7183** (3.125)	0.1646 (0.8259)	0.5144** (2.332)
D_4	-0.4181 (0.6035)	-0.6645 (0.9419)	0.6950** (2.493)	0.6704* (2.174)	0.2559 (0.7282)
DS_1	-0.2067 (1.247)	-0.2317 (1.301)	0.1151E-6 (1.075)	0.1644E-7 (0.2180)	0.6756E-7 (0.8491)
DS_2	0.2791 (1.628)	0.3314 (1.841)	0.1203E-6 (1.124)	0.2058E-7 (0.2725)	0.6351E-7 (0.7608)
DS_3	0.0497 (1.396)	0.0474 (1.286)	0.1324E-6** (1.257)	0.5635E-7** (0.7384)	0.9066E-7** (1.139)
DS_4	0.0063 (0.1353)	0.0076 (0.1556)	0.1002E-6 (0.9449)	0.221E-7 (0.2811)	0.5574E-7 (0.6849)
	n=35	*n=35*	*n=35*	*n=35*	*n=30*
	Buse R^2=0.97	*Buse R^2=0.97*	*Buse R^2=0.99*	*Buse R^2=0.99*	*Buse R^2=0.99*

Note: Figures in parentheses are t-statistics.

*significant at 10% level.

**significant at 5% level.

***significant at 1% level.

[a] Represents promotions in Singapore.

[b] Subscripts 1-4 refer to Japan, South Korea, Taiwan, and Hong Kong, respectively.

Table III. Promotion Elasticities by Country, Price and Income Elasticities by Region, Pacific Rim Almond Imports, 1986-1992.

	Cobb-Douglas		Exponential		
	Equation (1A)	**Equation (1B)**	**Equation (3A)**	**Equation (3B)**	**Equation (3C)**
Intercept	a	a	a	a	a
P_{ALM}	-1.6915***	-1.694***	-1.0511***	-0.7712***	-1.758***
P_{CSH}	-0.3426	--	-0.3747*	-0.3179	-0.1673
P_{NTS}	--	0.024	--	--	--
P_{SUG}	0.9737***	0.8526**	0.5333**	--	1.762***
P_{COC}	--	--	--	0.2291	--
Y	0.9243***	0.919***	0.10851	0.0501	0.0696
T	--	--	a	--	--
$PROM_{t-1}$	--	--	--	--	0.5387
D_1 [b]	a	a	a	a	a
D_2	a	a	a	a	a
D_3	a	a	a	a	a
D_4	a	a	a	a	a
Promotion					
Japan	-0.2568	-0.2788	-0.1924	-0.1559	-0.0528
South Korea	0.2290	0.2843	0.1609	0.1259	-0.3796
Taiwan	-0.0004	0.0003	0.3477***	0.8511***	0.3906***
Hong Kong	-0.0438	-0.0395	-0.2483	0.0677	-0.2384
Singapore	-0.0501	-0.0471	-0.1391	-0.0211	-0.0856

Note: Elasticities in the exponential form are calculated at the mean.

*significant at 10% level.
**significant at 5% level.
***significant at 1% level.

[a] Variables included in the estimation, but for which elasticities are not meaningful.

[b] Subscripts 1-4 refer to Japan, South Korea, Taiwan, and Hong Kong, respectively.

Table A1. Intercept and Promotion Coefficients by Country, Pacific Rim Almond Imports, 1986-1992.

	Cobb-Douglas		Exponential		
	Equation (1A)	**Equation (1B)**	**Equation (3A)**	**Equation (3B)**	**Equation (3C)**
Intercept					
Japan	10.91 [3.724]	8.183 [1.945]	-150.53*** [10.101]	10.9974*** [1070.06]	10.5581*** [694.00]
South Korea	2.073 [0.1348]	-2.053 [0.1497]	-153.65*** [10.444]	8.8703*** [237.45]	8.2578*** [166.19]
Taiwan	6.5271 [1.962]	3.429 [0.5102]	-153.98*** [10.509]	7.7426*** [923.73]	7.6614*** [1789.74]
Hong Kong	6.7219 [2.192]	3.846 [0.6511]	-154.01*** [10.511]	8.2484*** [836.82]	7.4029*** [596.91]
Singapore	7.14 (1.601)	4.51 (0.9271)	-154.7*** (3.254)	7.578*** (31.96)	7.147*** (24.77)
	{8.965}	{10.493}	{278.71}***	{1538.4}***	{2134.0}***
Promotion					
Japan	-0.2568 [2.534]	-0.2788 [2.562]	-1.5E-9 [2.089]	-1.24E-9 [2.679]	-4.23E-9 [3.173]
South Korea	0.229 [1.828]	0.2843 [2.608]	3.7E-9 [0.755]	2.9E-9 [0.456]	-8.28E-9 [0.621]
Taiwan	-0.0004 [0.671]	0.0003 [0.0003]	1.58E-8*** [13.87]	3.867E-8*** [50.27]	1.887E-8*** [37.01]
Hong Kong	-0.0438 [1.92]	-0.0395 [1.487]	-1.64E-8 [2.492]	4.47E-9 [0.114]	-1.605E-8 [1.379]
Singapore	-0.0501 (1.411)	-0.0471 (1.297)	-0.1166E-6 (1.088)	-0.1768E-7 (0.2345)	-0.7179E-7 (0.8996)
	{9.108}	{9.083}	{27.673}***	{57.263}***	{48.27}***

Note: Figures in parentheses are t-statistics. Figures in brackets are Wald chi-square statistics, with one degree of freedom, associated with individual hypothesis tests of the significant difference of each country's intercept coefficient from zero and each country's promotion coefficient from zero. Figures in braces are Wald chi-square statistics, with five degrees of freedom, associated with joint hypothesis tests of the significant difference of each country's intercept coefficient from one another and each country's promotion coefficient from one another.

*significant at 10% level.
**significant at 5% level.
***significant at 1% level.

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