Competitiveness and Consumer Preferences of US Fruits in Taiwan

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Abstract

Taiwan is a major importing country of US fruits. This study examines the market competitiveness and consumer preferences of US fruits in Taiwan using cross-sectional data. Results indicate that for either retailers or consumers, imported US fruits compete favorably with domestic grown fruits in the Taiwanese fruit markets.

Introduction

The globalization of agricultural markets extends opportunities of international trading for producers and marketers. Rae (1997) pointed out that East Asia emerged as the world's fastest growing regional markets for agricultural products. Fundamental changes in consumption structure, rapid economic development, and comparative disadvantages of producing certain agricultural products offered opportunities to other countries that could fulfill the demand for imports. Adams *et al.* (1997) mentioned that exporting agricultural products played an important role in the success of US agribusiness. Furthermore, a large amount of money been spent on consumer promotion each year was aimed to expand overseas retail demand for US agricultural products under the 1985 Food Security Act (Henneberry *et al.*, 1992).

Several studies indicated that US export promotion had positive effects on US agricultural exports. Rosson *et al.* (1986) evaluated export promotion of US apples, poultry, and unmanufactured tobacco. For every dollar endowed in export promotion, marginal returns for apples and tobacco increased $60 and $31, respectively. Halliburton and Henneberry (1995) found that for every dollar invested in the US almond export promotion, the gross rates of return were US$4.95 in Japan, US$8.59 in Taiwan, and US$5.94 in Hong Kong. Of the total expenditures of US overseas market promotion, the Pacific Rim region accounted for the largest share of the Cooperator/Export Incentive Program and the biggest amount of Targeted Export Assistance (TEA) expenditures (Henneberry *et al.,* 1992).[1]

Fuller *et al.* (1992) found that promotion expenditures of exports significantly increased sales of US grapefruits in Japan, France, and the Netherlands. Exports of US fresh fruits accounted for about 5 percent of total value of production, $6 billion, in 1987. Kaufman *et al.* (2000) indicated that US fresh fruits exported by grower-shippers reached $1.1 billion in 1997,

[1] Of the total expenditures of the Cooperator/Export Incentive Program, 34% were for technical assistance, 15% for trade service, 41% went to generic consumer promotion, and 10% for branded advertising. Of the total TEA expenditures, 53% went to generic consumer advertising, 40% were spent on branded promotion, and 7% were for technical assistance and trade service (Henneberry *et al.,* 1992).

15 percent of total value of fresh fruit production. Sparks *et al.* (1990) examined four exporting markets of US fresh apples and revealed that import shares of US fresh apples in Hong Kong and in United Kingdoms would slightly increase, while the shares in Canada and in Singapore would be maintained. For US fresh orange exports, Sparks (1992) found the import shares would increase in Canada, Singapore, and Hong Kong as these markets grew.

Among the overseas markets of US fresh fruits, Taiwan is relatively new and is increasing in its importance. In 2000, 99 thousand metric tons, worth US$56 million, of US fresh apples exported to Taiwan (Table 1). Taiwan was the largest importing country of US fresh apples until 1999, when Mexico took the lead. For US fresh plums and peaches, Taiwan is second to Canada. Taiwan imported 17 thousand metric tons and 41 thousand metric tons of US fresh plums and peaches, worth US$15 million and US$43 million, respectively, in 2000. The exporting quantities of US fresh plums and peaches to Taiwan have been increasing in the past three years.[2]

Table 1 Exports of US Fresh Fruits in Selected Countries (quantity in tons; value in US$1,000)

	1996		1997		1998		1999		2000	
Fruit/ Country	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Apples										
Mexico	81,215	41,519	87,837	43,759	68,918	38,547	132,105	72,880	185,200	102,255
Taiwan	115,449	78,752	114,187	76,491	110,696	67,061	96,900	55,751	98,711	56,204
Canada	82,201	64,811	93,477	66,763	90,770	66,859	91,353	61,912	89,617	65,799
ROW	311,784	196,509	361,280	208,423	288,737	156,242	290,414	157,110	264,028	143,210
Plums										
Canada	22,328	20,298	25,587	21,729	20,883	21,867	20,370	20,338	20,785	20,892
Taiwan	21,410	19,424	20,899	18,197	10,220	9,385	14,339	12,971	16,587	15,379
Hong Kong	12,032	10,849	11,982	10,950	9,374	9,429	8,871	8,851	8,898	8,148
ROW	11,237	9,863	14,030	10,877	13,606	12,789	12,314	10,818	13,749	13,436
Peaches										
Canada	42,117	41,969	51,955	44,422	40,377	38,369	49,458	41,935	50,134	43,143
Taiwan	16,159	18,132	26,416	32,672	18,060	23,536	31,729	39,565	40,801	43,214
Mexico	8,801	4,503	16,156	8,005	15,290	7,624	10,888	7,153	15,497	10,358
ROW	8,717	8,062	10,165	8,518	6,313	5,986	8,255	7,848	9,080	8,392

Source: United States International Trade Commission

In the Taiwanese domestic fruit markets, US fruits accounted for more than 50 percent of total imported fruits, and US is the largest fruit exporting country to Taiwan. In 2000, Taiwan imported a total of 245 thousand metric tons, worth US$205 million, of US fruits. US fresh apples, plums, and peaches accounted for 79 percent, 92 percent, and 88 percent of total import

[2] Taiwan is ranked third in US fresh cherry exports, third in US fresh apricot exports, fourth in US fresh grape exports, fifth in US fresh pear exports, sixth in US fresh grapefruit exports, and seventh in US fresh orange exports in 2000.

quantities of the respective fruits in Taiwan in 2000 (Council of Agriculture, 2001).[3,4] Thailand is the second largest source of fruit imports to Taiwan. However, limited quantities of 73 thousand metric tons of Thai fruits were imported into Taiwan in 2000. US is considered the number one competitor to the domestic fruit growers in Taiwan.

Prices of seasonal domestic fruits fluctuate periodically, conditioned on harvest quantities and the time of the year. Prices of US fruits in Taiwanese fruit markets remain relatively stable throughout the year. Most exported US fruits use sticker labels with the four digit PLU (price look up) numbers. When the imported fruits are displayed at retailing stages in the Taiwanese fruit markets, sticker labels of imported fruits can be regarded as a way to identify origins of the exporting countries. Compared to non-labeled imported tropical fruits or domestic fruits, US fruits have distinguishable characteristics for retailers and consumers in the markets.

The annual per capita consumption of fresh fruits is about 136 kilograms in Taiwan. More than half of the surveyed households purchase fruits once in every two to three days. Seasonal fruits are popular. However, the majority of surveyed households purchased apples, more than other varieties of domestic fruits. In Taiwan, fruits are sold at different forms of outlets. The vast majority of household food shoppers prefer buying groceries at traditional markets, where fruits are sold at stands owned or rented by individual retailers. Imported fruits are placed beside domestic seasonal fruits on stands. Although bulk sales offered by supermarkets or supercenters are attractive to customers, less than half of the household shoppers purchase fresh fruits at these locations regularly (Wang, 2001). Traditional markets are still functioning well in providing food products and services to nearby residences.[5]

Imported agricultural products can be competed favorably or unfavorably with domestic products in the local markets. Consumers get accustomed to foreign products and often compare characteristics of the products that are domestically made with those of imported commodities. Tse and Gorn (1992) mentioned that country of origins had greater influences on evaluations of product qualities than brand names to consumers. Wood *et al.* (1999) emphasized the importance of understanding the factors related to consumer preferences for characteristics associated with foreign products.

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[3] Fresh apples from Chile accounted for 10 percent of total imported quantities of apples in Taiwan.

[4] US fresh cherries (81%), fresh grapes (97%), fresh pears (93%), fresh grapefruits (95%), fresh oranges (97%), and fresh apricots (86%) are dominate in the market of imported fruits in Taiwan (percentages in parenthesis are shares of US fresh fruits with regard to total imports of the respective fruits in 2000).

[5] Fruit specialty stores are commonly seen at major intersections in Taiwan. Some premium fruits can be found in those stores and are usually purchased for gifts. Roadside stands are the other forms of fruit retailing. Some stands are specialized in selling one kind of fruits, but most stands sell limited varieties of imported fruits and several seasonal domestic fruits.

The objectives of this study are to examine the competitiveness and consumer preferences of US fruits in Taiwanese fruit markets. For the large amount of US fruits imported into Taiwan, understanding the overall performance of the US fruits in the local markets and characteristics that influence consumers' purchasing decisions can be beneficial for US fruit growers and exporters.

Research Framework

Competitiveness is a broad concept that can be considered in different levels. Two common features, whatever the level of analysis is, are that competitiveness should be assessed in a relative matter and that the outcome of evaluation should be on a dynamic performance. Most researchers appear to take a trade-based approach following the concept that if the sector exports more than its imports, then it is competitive from the trading standpoint. Such approach relies on calculating certain aggregated measurements of indices, however, lacking identifications of the key factors for gaining competitiveness in the exporting markets.

Since the focus of this paper is with competitiveness of US fruits in the Taiwanese fruit markets, we consider the US fruit industry and the Taiwanese domestic fruit industry are rivalry alliances within the local markets. Therefore, the focus of this study is according to the management points of view instead of deriving indices of competitive advantages for US fresh fruits in Taiwan. In order to retain competitiveness, firms set up various strategic decisions and adopt marketing practices in a wide range. No matter what distinctive competences can be obtained by adopting cost leadership, product differentiation, or focus strategies (Porter, 1980), the payoffs that ordinary firms pursuing are in common, i.e., market share dominance and profitability above average for the industry. Hence, the ideal way for assessing competitiveness is to examine in-depth the factors that are influential and evaluate characteristics that can be beneficial to the firms.

Day and Wensley (1988) proposed a conceptual framework that distinguishes the sources of advantages from their consequences for relative competitive position and performance superiority. Under the source-position-performance (SPP) framework, two distinct approaches have been identified. One is primarily competitor-centered, and the other starts with the market and is customer-focused. The competitor-centered assessments are based on direct management comparisons with a few target competitors, usually is confined to direct rivals. Hence, the emphasis is on relative skills, resources, and the resulting cost position. The search is directed toward finding those activities that the firm does better than its competitors. While customer-focused assessments analyze consumer benefits within end-use segments and work backward from the customer to the company to identify the actions needed to improve performance.

In this study, both the competitor- and the customer-focused approaches based on the SPP framework are adopted to provide balanced and comprehensive assessments for the

competitiveness and consumer preferences of US fruits in Taiwanese fruit markets. The markets are segmented based on the proportions of selling and purchasing US fresh fruits over total fruit sales and total fruit expenditures for retailers and consumers, respectively. Factor analysis is applied in this study to gain further insights into the correlated characteristics within each segment of retailers and consumers. The advantage of factor analysis is that it can explore relationships among variables and create underlying factors that are uncorrelated. Scree plots are used to help determine the number of factors needed for the analysis, and hypotheses testing are carried to decide the dimensions of factors. The maximum likelihood method is applied to solve the factor equations for the advantages of its invariance to the variable units and utilization of the likelihood ratios in hypotheses testing. The Varimax rotation method is used to rotate axes for generating factors with meaningful interpretations.[6]

Data

Cross-sectional survey data were used in this study. Two different surveys were conducted separately in three most populated metropolitan areas (Taipei, Taichung, and Kaohsiung) in Taiwan in 2000. One survey was specialized for fruit retailers, including supercenters, supermarkets, fruit shops, and fruit stands (in traditional markets and at roadsides). The purpose of this survey was to gather information of US fruit overall competitiveness at retailing stages. A total of 80 valid samples were obtained from fruit retailers. A different survey was designed for household primary food shoppers. Information of preferences and characteristics affecting fruit purchasing decisions were collected. A total of 420 valid samples were utilized in the study.

The purpose of surveying both retailers and consumers was to obtain point-of-views of US fruits versus domestic fruits at two different stages in Taiwan. For those characteristics of US fresh fruits that are important to retailers may not be valued the same to consumers. The evaluations of US fresh fruits in Taiwan from the views of retailers and consumers provide valuable and comprehensive insights into this expanding market.

The repertory grid technique developed by Kelly (1955) was adopted in this research to measure the distinctions between US fresh fruits and domestic fruits among various characteristics. The repertory grids allow survey respondents to view, understand, compare, and predict events in the environment using "personal constructs". People use personal experiences as perceptions in evaluating and predicting events. These perceptions were described as "constructs" by Kelly (1955). Although the "constructs" were individual, different people may

[6] Numerous ways can be applied to solve the factor equations. Among the lists are principal factoring, Rao's canonical factoring, alpha factoring, image factoring, maximum likelihood, unweighted least squares, and Harris factoring. For orthogonal rotation methods, Quartimax, Varimax, Transvarimax, Equamax, Ratiomax, and Parsimax are the choices. The maximum likelihood and Varimax rotation are the most commonly applied methods (Johnson, 1998).

display similar patterns. The repertory grid technique has been used in the areas of consumer cognition and retailing (see Hudson, 1974; Hallsworth, 1987; Mitchell and Kiral, 1998). The most preferred merit of Kelly's repertory grid technique is free of interviewer bias.[7]

In the questionnaires for retailers, characteristics of the imported US fresh fruits versus domestic fruits were listed based on the source-position-performance framework. To obtain source differences in retailers' views, varieties, product packaging, adequate product supplies, quality consistence, financial facilities, grading, and promotion by importing agency were listed. For position differences, looks, freshness, safety, taste, size diversities, and price stability were specified. In the category of product performance, customer satisfaction, profitability, sale easiness, effectiveness of promotion, price reasonableness, and sticker labels were included.

In the questionnaires for consumers, characteristics were also specified based on the source-position-performance framework with fewer dimensions since consumers may not be familiar with certain specifications of US fresh fruits at the retailing stages. For source differences, varieties, packaging, qualities, and grading were listed. For position differences, looks, freshness, safety, taste, and price stability were specified. For performance differences, promotion, price reasonableness, and product labels were included.

Each of the characteristics was specified in two opposite statements in the questionnaires. Take price stability as an example, survey respondents were asked to compare "prices of US fresh fruits are stable" and "prices of domestic fresh fruits are stable." If the specified characteristics of US fresh fruits were favorable, positive scores (one or two, depending on the degree of favorableness) were marked. If the specified characteristics of domestic fruits were favorable, negative scores (minus one or minus two) were marked. Zero scores indicated no differences of the specified characteristics.

Results

The evaluations of characteristics were averaged based on the proportions of selling US fresh fruits over total sales of fruits for retailers, and the proportions of purchasing US fresh fruits over total fruit expenditures for consumers. For those retailers who sell more US fresh fruits may be more favorable to some characteristics then those retailers who sell less US fresh fruits. The same concept applied to consumers. For those consumers who spent more on US fresh fruits may prefer certain characteristics of US fresh fruits to domestic fruits.

Table 2 lists the mean scores of 19 characteristics based on retailers' views. Total samples were separated into three segments. Sales of US fresh fruits accounted for more than 60 percent, more than 40 percent but less than 60 percent, and less than 40 percent over total value

[7] Items can be ambiguous or appeared to imply a neutral attitude in the Likert scales. Measures of constructs may be desirable in conducting surveys (Lin and Jones, 1997).

of fruit sales were grouped together. Positive scores indicate favorable to the characteristics of US fresh fruits, and negative scores indicate favorable to the characteristics of domestic fruits. Results showed consistency in favoring US fresh fruits as the sales of US fruits increased. However, packaging, price stability, and profitability were three characteristics that did not show consistent increasing or decreasing trends in the mean scores.

Table 2 Differences in Competitiveness of US vs. Domestic Fresh Fruit Characteristics at Retailing Stages

Characteristics \ Selling Percentages of US Fruits	Sell more than 60% US fruits[a]	Sell more than 40% but less than 60% US fruits	Sell less than 40% US fruits
Source			
Varieties	0.6875[b]	0.0000	-0.6792
Packaging	1.4375	1.5000	0.9434
Adequate Supplies	1.2500	0.2895	-0.0566
Qualities	1.6250	1.1579	0.8019
Financial Facilities	1.6875	0.2368	0.1604
Grading	1.8125	1.2368	0.9717
Agent Promotion	1.8125	1.2105	0.7547
Position			
Looks	1.5625	0.7632	0.5283
Freshness	0.5625	0.0000	-0.3396
Safety	0.6250	0.5526	0.2925
Taste	0.7500	0.1579	0.0472
Size Diversities	1.0625	0.6053	0.4528
Price Stability	0.6875	0.8158	0.5377
Performance			
Customer Satisfaction	0.7500	0.5000	-0.1038
Profitability	0.1875	0.6316	-0.3774
Sale Easiness	0.8125	0.5789	-0.3774
Promotion Effectiveness	1.0000	0.8158	0.4623
Price Reasonableness	0.8750	0.2368	-0.3679
Product Labels	1.4375	0.5526	0.2830
	Kruskal-Wallis test statistic = 27.247, p-value = 0.074		

[a] Percentages of selling US fresh fruits were calculated on total value of fruit sales.
[b] 2 : US fruits have the most favorable characteristics in the specified items;
-2 : Taiwanese fruits have the most favorable characteristics in the specified items.

Grading and agent promotion were the most favorable characteristics for retailers who sell more than 60 percent of US fruits over total fruit sales. In this segment, overall ranking is

toward US fresh fruits. All the mean scores were positive. For retailers who sold more domestic fruits, mean scores of these characteristics were relatively lower. In this segment, characteristics as varieties, adequate product supplies, freshness, customer satisfaction, profitability, sale easiness, and price reasonableness had negative mean scores. This indicated that these characteristics were not favorable by retailers who sell less than 40 percent of US fresh fruits over total fruit sales. In other words, retailers who sold more domestic fruits tended to favor these characteristics of domestic fruits.

In order to test for the differences of mean scores among these three segments, the Kruskal-Wallis test was applied. The null hypothesis of the test is that mean scores of three segments are identical. The alternative hypothesis is that at least one of the segments tend to yield larger mean scores then at least one of the other segments.[8] The Kruskal-Wallis test was rejected at ten percent of significance level, indicating that mean scores of characteristics in these three segments were not identical.

Table 3 lists the mean scores of 12 characteristics based on consumers' views. As for retailers, consumers were grouped into three segments: spent more than 60 percent, more than 40 percent but less than 60 percent, and less than 40 percent on US fresh fruits over total fruit expenditures. Positive scores mean favorable to characteristics of US fresh fruits, and negative scores mean favorable to characteristics of domestic fruits. Results indicated that consumers were not toward US fresh fruits as retailers were. More negative mean scores were listed. Even for those consumers who spent more than 60 percent of total fruit expenditures on US fresh fruits, characteristics of varieties, freshness, taste, price stability, and price reasonableness were favored toward domestic fruits. Packaging, taste, price stability, and price reasonableness were the characteristics that did not show consistent increasing or decreasing trends in the mean scores as the proportions of purchasing US fruits increased. The Kruskal-Wallis test was applied to the mean scores of characteristics based on consumers' views. The null hypothesis of identical mean values was rejected at the one-percent significance level.

Based on the views of both retailers and consumers, characteristics of packaging, grading, looks, promotion, and labels were favorable toward US fresh fruits, regardless the amount of US fruits they had sold or consumed. One interesting result was that consumers were not valuing grading or looks of imported US fruits as much as packaging or labels. This suggests that grading or looks might be more important to retailers than to consumers in terms of setting retail prices. However, for either retailers or consumers, imported US fruits compete favorably with domestic fruits on these characteristics in the Taiwanese fruit markets.

[8] Kruskal-Wallis test is an applied nonparametric method to test for differences among k independent samples, obtained from k different populations. The purpose of Kruskal-Wallis method is to test the null hypothesis that all of the populations are identical against the alternative that some of the populations tend to furnish greater observed values than other populations (Conover, 1999)

Table 3 Differences in Consumer Cognition of US vs. Domestic Fresh Fruit Characteristics

Characteristics \ Selling Percentages of US Fruits	Spent more than 60% on US Fruits[a]	Spend more than 40% but less than 60% on US Fruits	Spend less than 40% on US fruits
Source			
Varieties	-0.6275[b]	-0.6345	-1.1164
Packaging	0.8627	0.6027	0.6466
Qualities	0.1633	-0.1507	-0.4026
Grading	0.3922	0.3931	0.2716
Position			
Looks	0.3800	0.3288	0.0862
Freshness	-0.4510	-0.7260	-1.2232
Safety	0.4706	0.2653	-0.0043
Taste	-0.2745	-0.1849	-0.7897
Price Stability	-0.4200	-0.2109	-0.5345
Performance			
Promotion	0.4706	0.2276	0.0687
Price Reasonableness	-1.0000	-0.6781	-1.0948
Product Labels	0.8000	0.5479	0.5322
	Kruskal-Wallis test statistic = 31.306, p-value = 0.001		

[a] Percentages of expenditures spent on US fresh fruits were based on total expenditures spent on fresh fruits

[b] 2 : US fruits have the most favorable characteristics in the specified items;
-2 : Taiwanese fruits have the most favorable characteristics in the specified items

Since some of the characteristics may be correlated beyond the clustering from source-position-performance standpoints, the factor analysis was applied to gain further insights into the correlation among characteristics. The scree plots and hypotheses testing suggested that three factors were appropriate for either retailers or consumers. For retailers, the dimension of first factor indicated composite characteristics, including characteristics of taste, safety, looks, freshness, financial facilities, consumer satisfaction, product labels, promotion effectiveness, and size diversities. The second factor is all source-related, including qualities, packaging, grading, adequate supplies, and agent promotion. The dimension of the third factor is profit-driven, including price reasonableness, sale easiness, profitability, price stability, and varieties (Table 4). The patterns of factors showed that some attributed were more associated then other characteristics. The characteristics with high loadings indicate product competitiveness (Wood *et al.*, 1999).

Table 5 lists the factor patterns of consumer cognition of characteristics. The dimension of the first factor indicated value-added characteristics, including product labels, packaging, grading, promotion, and safety. Quality, taste, and looks were more influential in the second

factor and could be termed product quality. The third factor indicated price/freshness and included characteristics of varieties, price reasonableness, freshness, and price stability.

Table 4 Rotated Factor Loadings of Characteristics at the Retailing Stages

Characteristics \ Factors	Composite Characteristics	Source-Related	Profit-Driven
Taste	**0.7857**	-0.0693	0.2966
Safety	**0.7103**	0.0982	0.1050
Looks	**0.6836**	0.3078	-0.0039
Freshness	**0.6826**	0.2090	-0.0117
Financial Facilities	**0.6118**	0.2841	0.0421
Customer Satisfaction	**0.5573**	0.2188	0.5454
Product Labels	**0.5378**	0.2744	0.2223
Promotion Effectiveness	**0.5176**	0.1197	0.2888
Size Diversities	**0.4291**	0.3519	0.1862
Qualities	0.2335	**0.8413**	0.1147
Packaging	0.2599	**0.6746**	-0.0221
Grading	0.2167	**0.6654**	0.2836
Adequate Supplies	0.0180	**0.5392**	0.3166
Agent Promotion	0.3513	**0.3904**	0.3525
Price Reasonableness	0.2286	0.2148	**0.7129**
Sale Easiness	0.3247	0.2216	**0.6735**
Profitability	-0.1322	-0.0656	**0.6401**
Price Stability	0.1301	0.2000	**0.4544**
Varieties	0.3291	0.2465	**0.3399**

Table 5 Rotated Factor Loadings of Consumer Cognition

Characteristics \ Factors	Value-Added	Product Quality	Price/Freshness
Product Labels	**0.7253**	0.0945	-0.0144
Packaging	**0.7169**	0.0774	-0.1192
Grading	**0.6581**	0.1620	0.1467
Promotion	**0.4005**	0.1200	0.1099
Safety	**0.3646**	0.1937	0.1322
Qualities	0.2143	**0.7725**	0.1982
Taste	0.1455	**0.6228**	0.3317
Looks	0.3440	**0.5201**	0.0046
Varieties	0.0127	0.1099	**0.6341**
Price Reasonableness	-0.0347	0.1953	**0.6043**
Freshness	0.0186	0.4566	**0.5364**
Price Stability	0.1914	0.0139	**0.3617**

Factor scores were calculated for retailers selling US fresh fruits and consumers purchasing US fresh fruits at different proportions. The relative importance revealed by the factor scores may indicate the characteristics that were valued by different segments of retailers and consumers. Figure 1 shows the factor scores of three dimensions of US versus Taiwanese fresh fruits at retailing stages. For retailers who sold US fresh fruits more than 60 percent over total fruit sales, the dimension of the first factor, composite characteristics, seemed to be more important. Although the source-related characteristics were ranked at higher mean scores for the segment of retailers selling more US fresh fruits as indicated in Table 2, the source-related underlying factor was not valued as much as the dimension of composite characteristics in Figure 1.

When each single item was questioned to retailers for comparisons, characteristics listed under the section of source may seem to be relatively important. However, the underlying factors that were highly correlated as revealed by the factor analysis did not necessarily need to match the individual items with higher mean scores. When US fresh fruits compete with Taiwanese fruits at the retailing stages, a group of characteristics are to be considered jointly instead of individually. Each characteristic under the source-position-performance framework can be evaluated only at a relative importance to other characteristics from the measure of the mean scores. The dimensions from the factor analysis give in-depth views of various sets of characteristics that the importance is evaluated overall.

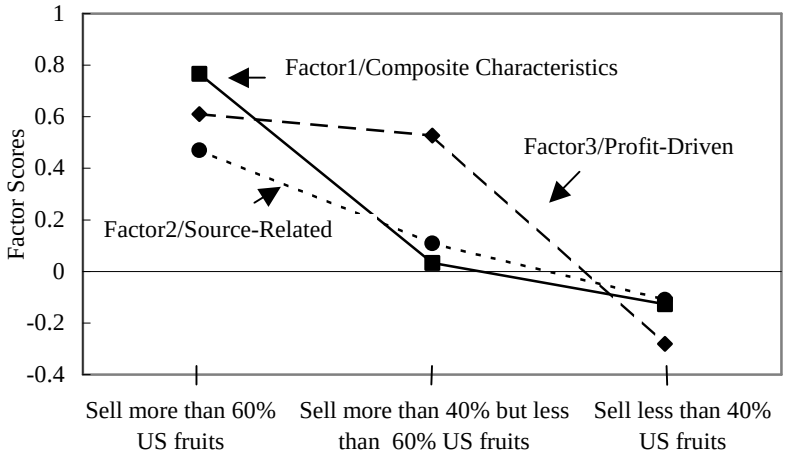

Figure 1 Factor Scores of Three Factors/Dimensions for Competitiveness of US vs. Taiwanese Fresh Fruits at Retailing Stages

For retailers who were more experienced with selling the US fresh fruits, the underlying factor of composite characteristics was more desired. For retailers whose sales of US fresh fruits were accounted for less than 60 percent but more than 40 percent of total fruit sales, the profit-driven seemed to be more valuable than the other two factors. For retailers who had limited sales

of US fresh fruits, source-related factor was more important. The factor score of composite characteristics was very close to the score of source-related factor in this segment, indicating that for these retailers, source-related factor and composite characteristic factor were not quite distinguishable. The results of the factor analysis at the retailing stage implied that retailers who sold US fresh fruits at different proportions had different evaluations for these three factors/dimensions.

Figure 2 shows the factor scores of three factors/dimensions in consumer cognition of US versus Taiwanese fresh fruits. For consumers who purchased US fresh fruits more than 60 percent of total consumed fruits, product quality was viewed as the most important underlying factor. The value-added and price/freshness factors were not distinguishable for this segment of consumers. For consumers who spent more than 40 percent but less than 60 percent of fruit expenditures on US fresh fruits, the underlying factor of price/freshness were more desirable. For consumers who had consumed limited amount of US fresh fruits, the value-added factor was preferred. The results of the factor analysis for consumers also implied that consumers with different proportions of consuming US fresh fruits over total fruits had different evaluations for these three factors/dimensions.

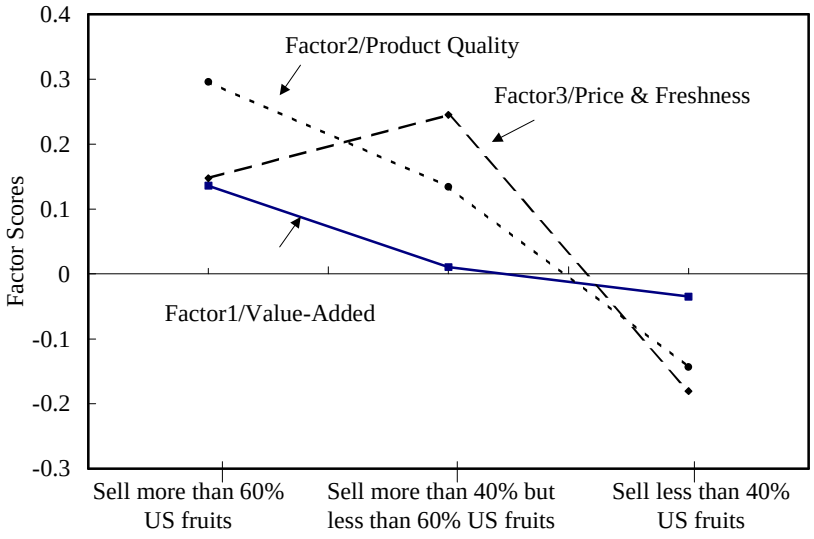

Figure 2 Factor Scores of Three Factors/Dimensions in Consumer Cognition of US vs. Taiwanese Fresh Fruits

For US fruit growers or exporters, the expanding fruit markets in Taiwan indicate opportunities and challenges. Since selling US fresh fruits to an overseas market facing the obstacles in willingness of acceptance by both local retailers and consumers, the promotion of US fresh fruits can be more effective when the characteristics valued by both retailers and consumers are revealed. The marketing strategies designed under specific purposes would have

better chances to success once the market is segmented and the underlying influential factors are indicated.

Conclusions

Taiwan has been a growing market for US fresh fruit exports in the recent years. This study is to evaluate the competitiveness and consumer preferences of US fresh fruits in the Taiwanese fruit markets. The source-position-performance framework was utilized and factor analysis was applied. Retailers and consumers were segmented by the proportions of selling and purchasing US fresh fruits over total fruit sales and expenditures, respectively. The more US fresh fruits sold by the retailers, the more favorable they were toward the characteristics of US fresh fruits. Consumers were not favorable to US fresh fruits as much as retailers were, even for those consumers spending more on US fresh fruits than on domestic fruits.

Three factors, composite characteristics, source-related, and profit-driven, were specified for retailers. The factor scores indicated that for retailers selling more US fresh fruits, the composite characteristics were valued more than the other two factors. For retailers who sold about the same amount of US fruits and domestic fruits, the profit-driven factor is more important. The source-related factor was ranked higher for retailers who preferred selling more domestic fruits.

For consumers, factors were classified as value-added, product quality, and price/freshness. For consumers who consumed more US fruits than domestic fruits, the product quality dimension was more important. For consumers who were consuming about the same amount of US fruits and domestic fruits, the price/freshness was valued more than the other two factors. Consumers who liked domestic fruits more than imported US fruits seemed to have the propensity toward the value-added dimension.

The Taiwanese fruit markets have the uniqueness for US fruit growers and exporters regarding its dominance in fruit imports of Taiwan and importance in fruit exports of US. This study intends to examine the competitiveness and consumer preferences of US fruits versus Taiwanese fruits in the local markets. Results of this study indicate that for either retailers or consumers, imported US fruits compete favorably with domestic fruits in the Taiwanese fruit markets.

References

Adams, B.H., K.L. Jensen, and G.C. Davis (1997), "Knowledge and Use of Export Assistance Services by Agribusiness," *Agribusiness*, 13(3):285-294.

Conover, W.J. (1999), *Practical Nonparametric Statistics*, third edition, New York: John Wiley & Sons.

Council of Agriculture, Basic Agricultural Statistics, Taiwan, website: www.coa.gov.tw

Day, G.S., and R. Wensley (1988), "Assessing Advantage: A Framework for Diagnosing Competitive Superiority," *Journal of Marketing*, 52(2):1-20.

Fuller, S., H. Bello, and O. Capps, Jr. (1992), "Import Demands for U.S. Fresh Grapefruit: Effect of U.S. Promotion programs and Trade Policies of Importing Nations," *Southern Journal of Agricultural Economics*, 24(1):251-260.

Halliburton, K., and S. Henneberry (1995), "The Effectiveness of U.S. Nonprice Promotion of Almonds in the Pacific Rim," *Journal of Agricultural and Resource Economics*, 20(1):108-121.

Hallsworth, A.G. (1987), "Repertory Grid Methodology and the Analysis of Group Perceptions in Retailing," *International Journal of Retailing*, 3(4):43-54.

Henneberry, S. R., K.Z. Ackerman, and T. Eshleman (1992), "US Overseas Market Promotion: An Overview of Non-Price Programs and Expenditures," *Agribusiness*, 8(1):57-78.

Hudson, R. (1974), "Images of the Retailing Environment: An Example of the Use of the Repertory Grid Methodology," *Environment and Behavior*, 6:470-494.

Johnson, D.E. (1998), *Applied Multivariate Methods for Data Analysts*, Pacific Grove, CA: Duxbury Press.

Kaufman, P.R., C.R. Handy, E.W. McLaughlin, K. Park, and G.M. Green (2000), *Understanding the Dynamics of Produce Markets: Consumption and Consolidation Grow*, Food and Rural Economics Division, Economic Research Service, US Department of Agriculture, Agriculture Information Bulletin No. 758.

Kelly, G.A. (1955), *The Psychology of Personal Constructs*, Vols. 1-2, New York: Norton.

Lin, B., and C.A. Jones (1997), "Some Issues in Conducting Customer Satisfaction Surveys," *Journal of Marketing Practice: Applied Marketing Science*, 3(1):4-13.

Mitchell V.-W., and R.H. Kiral (1998), "Primary and Secondary Store-Loyal Customer Perceptions of Grocery Retailers," *British Food Journal*, 100(7):312-319.

Porter, M.E. (1980), *Competitive Strategy-Techniques for Analyzing Industries and Competitors*, New York: The Free Press.

Rae, A.N. (1997), "Changing Food Consumption Patterns in East Asia: Implications of the Trend Towards Livestock Products," *Agribusiness*, 13(1):33-44.

Rosson, C.P., M.D. Hammig, and J.W. Jones (1986), "Foreign Market Promotion Programs: An Analysis of Promotion Response for Apples, Poultry, and Tobacco," *Agribusiness*, 2(1):33-42.

Sparks, A.L. (1992), "A System-Wide Approach to Import Demand for US Fresh Oranges," *Agribusiness*, 8(3):253-260.

Sparks, A.L., J.L. Seale, Jr., and B.M. Buxton (1990), *Apple Import Demand: Four Markets for US Fresh Apples*, Commodity Economics Division, Economic Research Service, US Department of Agriculture, Agricultural Economic Report No. 641.

Tse, D., and G. Gorn (1992), "An Experiment on the Salience of Country-of-Origin in the Era of Global Brands," *International Journal of Marketing*, 1(1):57-76.

United States International Trade Commission, Trade Database, version 2.3.0, website: dataweb.usitc.gov

Wang, T.-H. (2001), *An Analysis of Fruit Consumption in Taiwan*, unpublished master's thesis, Department of Agricultural Marketing, National Chung Hsing University, Taiwan.

Wood, V.R., J.R. Darling, and M. Siders (1999), "Consumer Desire to Buy and Use Products in International Markets," *International Marketing Review*, 16(3):231-256.