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Research Updates

Price and Distribution Variations for Value-Added Vegetable Products in California

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An increasing proportion of retail-store salad vegetables are sold as prepackaged salads. National statistics indicate that a majority of consumers purchase these value-added pre-cut, pre-mixed, packaged leaf-vegetable salad mixes. Many growers of salad vegetables—including Dole Foods, River Ranch, Mann Packing, and Tanimura & Antle—are involved in this business as well as leading non-grower firms, such as Ready Pac. In areas near production sources, how much do distribution and consumer prices vary? Do large retail chains control the price and distribution variation, or are they fulfilling consumer demand as reflected by submarket demographics?

The Sample Data

This first phase of the research began with a sampling of data on prepackaged salad vegetables from 10 retail grocery stores in each of three California counties (Monterey, San Luis Obispo, and Santa Clara). The stores in each county were selected in a convenient pattern, clustered near the major urban areas. For San Luis Obispo County (SLO), the 10 stores were clustered about the city of San Luis Obispo (the county seat) and its suburban neighbors, Morro Bay and Los Osos; this included all supermarkets in the central part of the county. In Monterey County (MC) the stores were clustered about the city of Salinas, and in Santa Clara County (SCC), the selected stores were grouped along the Highway 101 corridor of the San Jose-Santa Clara area.

The observation method was used to collect the data. We are assuming that the in-store display data are representative of available product and that shopping patterns will not distort the picture of product availability. That is, the produce departments continually maintain the display in this category. The data that were collected from these central coast and northern California counties included average price per brand/manufacturer, a package count by brand, and an item count by brand/manufacturer. This data set provided ap-

proximately 42 percent of SLO's 24 supermarkets, a 24 percent sample of MC's 41 supermarkets, and a 10 percent sample of SCC's 98 supermarkets. These store numbers were defined by "Retail Grocer" listings in 1997 county telephone "Yellow Pages" listings. All observations were taken during the week between 10:00 a.m. and 2:00 p.m. to avoid heavy shopping hours and to capture a time that was possibly consistent with full displays. The supermarket definition of Schaffner, Schroeder, and Earle (1998) will be used to define the minimum-sized establishment with a full line of food offerings, self-service, and \$2 million in annual store sales.

In one county, SLO, greater specificity was achieved with a store-by-store collection of data by manufacturer, with an item-by-item designation of package size, number of product facings, number of product units, prices, and shelf space in inches being recorded. A branded item in a store was counted as one item. The 10 SLO supermarkets produced 124 individual packaged salad product observations.

Hypotheses & Objectives

It was hypothesized that prices in the largest chain stores would be more uniform than prices in other stores. Further, it was hypothesized that the display size and product variations would be larger for the larger chain stores. Lastly, it was hypothesized that the market leaders, Fresh Express and Dole Foods, would uniformly receive greater shelf space and command higher prices per unit.

Our ultimate objective with subsequent data sets is to assess differences in retail prices of packaged salads between stores and market areas, to define differences in retail distribution between stores and market areas, and to review possible demographic influences for such differences.

Analysis

This preliminary data set was analyzed using descriptive and non-parametric statistical applications supported by the *Minitab 10.2* program available at Cal Poly State University SLO. The more

extensive and representative SLO data were evaluated separately by ordinary least squares of the retail store variables' effects on brand item prices. For other analyses, the SLO data were aggregated to the same level as the MC and SCC data were.

An initial look at the data suggests some uniformity of mean brand prices by store or chain, with prices ranging from a low of \$2.29/package to a high of \$2.44/package (see Table 1). Tests of means will be done later on the more complete data sets but were not done here. The coefficients of variation (CV) of brand prices by store apparently reflect more uniform pricing by the larger chain stores as the larger the chain, the lower the CV in our first set of limited data. The set of independent retailers had the largest CV but the lowest prices; however, the recent grocery retailer acquisition activity in this sector is decreasing the number of separate entities. (For example, Safeway's acquisition of Von's and American Stores' acquisition of Lucky, but so far, Von's stores have retained the Von's identity in this area.)

Table 1. Coefficient of Variation of Store Price and Store Numbers by County.

Store/ Chain ^a	Price	CV		Counties		
		Mean	StDev	#MC	#SLO	#SCC
Von's	0.0754	2.2925	0.1729	0	4	0
Lucky	0.0551	2.2900	0.1262	3	2	4
Alb.'s	0.0463	2.4400	0.1131	0	2	0
Safeway	0.0293	2.3614	0.0691	2	0	5
Other Smrkt	0.1757	2.2088	0.3881	<u>5</u> 10	<u>2</u> 10	<u>1</u> 10

^a Von's stores were acquired by Safeway prior to the study. They remain under the Von's logo while American Stores (Albertson's) recently acquired Lucky Stores.

No apparent price leader emerges from this first data set as the largest chain stores did not have the lowest prices or prices that other stores felt compelled to match (see Goodwin, 1994). None of these packaged salad manufacturers were forward-integrated into retailing. Any market power, from imperfect competition on the supplier side¹ of the market, may be confounded by the imperfect competition of the retail side with possibly even stronger buying positions in a concentrated retail grocery market (Marion et al., 1979).

¹ Johnson cites a CR4 of 83.8 percent in this sector, Spring 1998.

The variables collected by brand or all of a manufacturer's products across all stores in the sample are presented in Table 2. The typical store carried three brands, 180 packages of salad, and had 17 distinguishable brand items in their display. Note that some stores carried only one brand, and those were usually the independents or smaller chains. Further, the store display sizes, as reflected in the number of packages and the number of distinct branded items, had a relatively large range of 48 to 340 packages and 3 to 39 items, respectively.

Table 2. Descriptive Statistics by Store for 30 California Central Coast Supermarkets, Spring 1997.

Variable	Mean	Median	TrMean	StDev	SEMean
# Brands	3.067	3.000	3.038	1.143	0.209
AvgPriceStore	2.295	2.335	2.328	0.2233	0.0408
# Packages	179.60	189.00	177.30	86.70	15.80
# Items ^a	17.05	16.00	16.61	8.65	1.94

Variable	Min	Max	Q1	Q2	CV
# Brands	1.0	6.0	2.0	4.0	0.3727
AvgPriceStore	1.28	2.52	2.237	2.407	0.0973
# Packages	48	340	101.2	230	0.4827
# Items	3	39	12	20.75	0.5073

^a The number of individual items within brands was not considered in SCC.

Brands in Store Representation

Nationally, Fresh Express is the market leader with a share of 36.6 percent, followed by Dole with a 27.4 percent share (Johnson, 1998). Not all stores carried all six brands found in the sample area (see Table 3). The most pronounced finding was the much larger variation in display sizes reflected in the package counts and brand item counts across stores as compared to price variation. Apparently, Fresh Express, the market leader, may have the largest displays and the greatest range in the number of items varying from 5 to 204 packages per store. One should note that package count CVs are substantially higher than price CVs by a multiple of four for all brands in Table 4.

Brands data in stores are summarized as observations in Tables 4 and 5. Note that Fresh Express and Ready Pac were present in the greatest number of stores. Price variation by brand across these 93 brand observations in 30 stores was fairly

Table 3. Descriptive Statistics by Packages of Salad Brand Items for 30 California Central Coast Supermarkets, Spring 1997.

Variable	N	Mean	Median	TrMean	StDev	SEMean
FreshExpress	26	86.80	74.5	85.30	57.20	11.2
Ready Pac	23	58.61	62.0	58.10	25.32	5.28
Dole	26	53.31	47.0	52.62	31.68	6.21
Tani & Antle	10	35.40	30.0	30.25	24.34	7.70
Mann Packing	2	8.00	8.0	*	*	*
Fresh Western	6	13.67	11.5	13.67	7.87	3.21

Variable	Min	Max	Q1	Q2	CV
FreshExpress	5	204	47.8	117.5	0.6590
Ready Pac	15	113	38.0	71.0	0.4320
Dole	6	117	27.0	82.5	0.5943
Tani & Antle	14	98	18.5	42.5	0.6876
Mann Packing	5	11	—	—	—
Fresh Western	5	26	7.3	21.5	0.5757

Table 4. Descriptive Statistics of Price by Brand from 30 California Central Coast Stores for Packaged Salads (n=93 brand observations).

Variable	N	Mean	Median	TrMean	StDev	SEMean
Price FE	26	2.2988	2.390	2.3350	0.2893	0.0567
PrcReadyPac	23	2.3948	2.420	2.4033	0.2227	0.0464
Price Dole	26	2.2692	2.290	2.3079	0.3090	0.0606
Price T&A	10	2.3400	2.290	2.3275	0.2792	0.0883
Price Mann	2	1.690	—	—	—	—
Price FWs	6	2.148	1.990	2.148	0.432	0.176
	93	2.1901	equally weighted grand mean			
		2.2959	observation weighted grand mean			
		2.2961	arithmetic mean of 93 brands in stores			

Variable	Min	Max	Q1	Q2	CV
Price FE	1.24	2.49	2.2850	2.4725	0.1238
PriceReadyPac	1.92	2.69	2.3100	2.5500	0.0930
Price Dole	0.98	2.63	2.1900	2.4900	0.1362
Price T&A	1.99	2.79	2.1550	2.5650	0.1193
Price Mann	1.59	1.79	—	—	—
Price FWs	1.74	2.69	1.777	2.690	0.2011

Table 5. Descriptive Statistics of Packaged Salad Brand Observations in 30 Central Coast Stores Price/Package and Package Count by Brand.

Variable	N	Mean	Median	TrMean	StDev	SEMean
Price	93	2.2961	2.3300	2.3225	0.3014	0.0313
PkgCount	93	57.98	47.00	53.54	42.92	4.45

Variable	Min	Max	Q1	Q2	CV
Price	0.98	2.79	2.190	2.490	0.1313
PkgCount	5	204	27.00	79.50	0.7403

^a Includes 27 cumulative brands reported in 10 SLO stores; 35 brands in 10 MC stores; and 31 brands in 10 SCC stores.

uniform as indicated by the CVs in Table 4. CVs of price and package count by brand, in Table 5, show apparent greater variability of display size as compared to price variability in this data set.

A visual inspection of Table 6 indicates twice as many products or items amongst the larger retailers' stores and a roughly equal split for smaller stores. Note this includes only 20 stores, as SCC stores "brand item" or product count was omitted in the data collection. This problem is addressed in the next expanded data collection phase of this study.

The comparison of store/chain affiliation against in-store display package count is presented in Table 7. The latter is our proxy for display size and could be limited by previous sales from the display during the shopping day. Von's and Safeway's had progressively greater numbers of stores in each higher-item category, but the package count was separated into group increments of 100 units. No definitive pattern is apparent across the 30-store sample.

San Luis Obispo County Prices

As mentioned earlier, the data in SLO was the most complete cluster. It consisted of all supermarkets in the central part of SLO, which included the county seat and the urbanized areas of Morro Bay and Los Osos to the west. This is an area bounded by the coastal mountains or foothills in the north and east, and by the ocean on the west. The area is separated from the south county area by some 8 to 10 miles of hills, an extension down the major north-south thoroughfare, US Highway 101.

Table 6. "Stores" vs. "ItemGrp" Contingency Table, Coastal California, Spring 1997.^a

ROWS: Stores	COLUMNS: ItemGrp		
	1-15	16+Items	ALL
Vons/Safeway	2 28.57 25.00 10.00	5 71.43 41.67 25.00	7 100.00 35.00 35.00
Lucky/Albertson's	2 33.33 25.00 10.00	4 66.67 33.33 20.00	6 100.00 30.00 30.00
Other Supermarkets	4 57.14 50.00 20.00	3 42.86 25.00 15.00	7 100.00 35.00 35.00
All Stores	8 40.00 100.00 40.00	12 60.00 100.00 60.00	20 100.00 100.00 100.00

^a "Stores" are Von's & Safeway, Lucky & Albertson's, and Other Supermarkets. "ItemGrp" is 1-15 items or brands, more than 15 items (39 maximum). Cell contents: Counts, RowPercents, ColPercents, and Tot Percents.

Table 7. "Stores" vs. "PkgGrp" Contingency Table.^a

Stores	Display Size/Package Count			
	1-99	100-199	200+	ALL
Von's & Safeway	2 16.67 28.57 6.67	4 33.33 36.36 13.33	6 50.00 50.00 20.00	12 100.00 40.00 40.00
Lucky & Albertson's	3 30.00 42.86 10.00	3 30.00 27.27 10.00	4 40.00 33.33 13.33	10 100.00 33.33 33.33
Other Supermarkets	2 25.00 28.57 6.67	4 50.00 36.36 13.33	2 25.00 16.67 6.67	8 100.00 26.67 26.67
ALL Stores	7 23.33 100.00 23.33	11 36.67 100.00 36.67	12 40.00 100.00 40.00	30 100.00 100.00 100.00

^a "Stores" are Von's & Safeway, Lucky & Albertson's, and Other Supermarkets. "PkgGrp" is 1-99 packages, 100-199 items, 200+ items. Cell contents: Counts, RowPercents, ColPercents, and TotPercents.

While the SLO cluster was a more complete sampling, we also gathered more explicit data on individual products. These data provided the guide for our continuing data collection efforts (see Table 8). Treating each individual product or branded item in a store as an observation, the 10 SLO supermarkets gave us 124 branded product observations. Assuming the number of product facings and product count are important, all stores and brands were defined by dummy variables with bases of the market leaders at retail (Von's & Safeway) and brand (Fresh Express). No retailer had an apparent higher "price per ounce" of product, and only Tanimura & Antle brand commanded a significantly higher price of 9 cents per ounce of product (see Table 9) as suggested by this SLO data (see Table 10). As the number of facings increased, price per ounce increased, a positive correlation, but an increased shelf space measure in shelf inches may lead to a decline in price per ounce, with greater volume items implying lower prices. Another factor that is not accounted for is individual store size, a variable to be collected in the next phase of the study.

Table 8. Descriptive Statistics of Packaged Salad Products from 10 San Luis Obispo County Supermarkets, Spring 1997.

Variable	N	Mean	Median	TrMean	StDev	SEMean
Item	124	7.081	7.000	6.929	4.199	0.377
size oz	124	9.107	8.000	8.964	3.200	0.287
prdtunit	124	10.43	7.00	8.60	11.87	1.07
price	124	2.3876	2.490	2.4141	0.5075	0.0456
facings	124	2.008	2.000	1.875	1.233	0.111
shlfspace	124	14.605	14.000	13.464	9.884	0.888
Price/oz	124	0.2986	0.2990	0.2955	0.1214	0.0109

Variable	Min	Max	Q1	Q2	CV
Item	1.000	18.000	4.000	10.000	0.5930
size oz	4.250	16.000	7.000	10.000	0.3514
prdtunit	1.00	70.00	5.00	10.00	1.1381
price	0.9900	3.2900	1.9900	2.6900	0.2126
facings	1.000	7.000	1.000	3.000	0.6140
shlfspace	6.000	58.000	7.000	21.000	0.6747
Price/oz	0.0619	0.5980	0.2174	0.3738	0.4066

Table 9. San Luis Obispo County Prices/Ounces by Item, Large Stores—Von's-Safeway and Lucky-Albertson's—vs. Limited Number of Smaller Chains or Supermarkets.

Predictor	Coef	StDev	t-ratio	pr
Constant	0.25720	0.02851	9.02	0.000
Vons	0.04085	0.03334	1.23	0.223
LuckyAlb	0.05488	0.03271	1.68	0.096

P per oz = 0.257 + 0.0409 Vons + 0.0549 LuckyAlb

sse=0.1210 R-sq=2.3% R-sq(adj)=0.7% D-W=1.89

Analysis of Variance					
Source	df	SS	MS	F	pr
Regression	2	0.04123	0.02061	1.41	0.248
Error	121	1.77060	0.01463		
Total	123	1.81182			

Table 10. San Luis Obispo County Cross-Section of Individual Product Prices, Packaged Salad Category from 10 Supermarkets, April 1997, LHS: Price Per Ounce of Product.

RHS Vars	Coefficients (t-values)	
	All Brands	Reduced Parameter Model
Constant	0.2906 (3.91)*	0.3212 (16.45)*
FreshExpr.	0.00692 (0.10)	
ReadyPac	0.04996 (0.92)	
Dole	0.03892 (0.69)	
T&A	0.1363 (2.17)*	0.08872 (2.46)*
MannPkg	0.0778 (0.68)	
Vons	-0.00525 (0.11)	Scolari -0.00604 (0.19)
Lucky	-0.02825 (0.53)	
Albertson's	0.00577 (0.10)	
Facings	0.1786 (3.94)*	0.1828 (4.32)*
Shelfspace	-0.02631 (4.63)*	-0.02709 (5.40)*
Rsq-adj/Ftest	29.5%/ 6.14* 10,113 df	29.5%/ 13.84* 4,119 df

The basis of the hypothesis is that the product leaders' offerings are perceived by consumers to be of superior quality. However, it could be that market leadership allowed these brands to resist excessive price discounting when the data were collected. We agree that a more complete test

would look at prices over some extended time horizon, not at a single collection point. Note that, when Fresh Express and Dole dummies were used, the coefficients were both positive; however, only Tanimura & Antle had a significant t-test value. Multicollinearity could be present.

Study Phase II— The Expanded Study Experimental Design

Continuation of the study, which is to take place over this academic year, will extend the greater detail collected in SLO County to examine many other areas of California. The data collection process is already under way in two additional areas: Santa Cruz County and western Monterey County, and Stanislaus County (in the San Joaquin or Central Valley). These efforts will utilize standardized data collection sheets to facilitate data collection and data entry. A random selection process will be used to define 30 store samples from the population of "Grocery Retailers" within a county. Lastly, as a point of reference or comparison, head lettuce prices will be collected at each store.

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Case Study of Heritage Ranch, "Wolf-Friendly Beef"

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Today, beef cattle producers face not only low commodity prices but also a change in consumer preferences. As price takers, cattle producers are looking for ways to increase revenue through such avenues as value-added products or direct mar-

keting. Heritage Ranch has engaged in a direct-marketing effort to generate more revenue at the farm-gate and to establish a niche within the beef market. The direct marketing effort became a consumer education campaign that is best defined as “eco-labeling.” This case study describes the direct marketing effort used to define the niche for Heritage Ranch.

The owner of Heritage Ranch is a fourth-generation New Mexico rancher who operates on public and private land and is known for his sustainable ranch management practices. He has received public recognition through numerous news reports and awards from various environmental organizations for his innovative methods. Two environmental groups, Defenders of Wildlife (DoW) and Forest Service Employees for Environmental Ethics (FSEEE) have developed third-party certification programs and have endorsed the management practices of Heritage Ranch. Their programs cover various aspects of ranch management, such as the encouragement of plant and animal diversity, the protection of riparian areas, and erosion control methods, as well as the humane treatment of cattle.

The cattle on Heritage Ranch are grass-fed and go straight from pasture to processor. The beef is hormone- and antibiotic-free. The beef is being marketed under all of these environmental attributes, plus it uses the slogan “Wolf Friendly.” It is common practice for ranchers in the West to engage the services of Animal Damage Control to kill predators. At Heritage Ranch, the herd is managed in a way that predators—such as wolves, coyotes, or mountain lions—are not a threat and are considered an integral part of the natural ecosystem. A part of each retail sale of Heritage Ranch beef goes into a compensation fund set up by DoW to compensate ranchers for livestock lost to predators under their Wolf-Country Approved program.

We established processing channels, which included a USDA-inspected slaughter facility and a USDA-inspected processor, to make the beef patties. A particular challenge in this project was to develop the promotional materials. We solicited advertising agencies in Albuquerque and interviewed them. The niche market that Heritage Ranch is trying to reach for its beef requires an innovative consumer education campaign since the marketing attributes involve rather complex environmental issues. An agency with eco-

labeling experience was sought. In the end, the rancher decided to go with a local agency, which he had worked with in the past, that did not have any food marketing or eco-labeling experience. A label design was not needed at this point because initial product was fresh ground.

According to USDA Food Inspection and Safety Service (FSIS), all point-of-purchase (pop) materials fall under their jurisdiction, and their approval is necessary for any claims or third-party certifications on pop materials. FSIS would not approve the two environmental groups’ third-party certifications without evaluating the criteria of those organizations. FSIS also decided to transfer this responsibility to another division of the U.S. Department of Agriculture (USDA), the Agricultural Marketing Service (AMS). The AMS indicated that an evaluation of the criteria for third-party certification program approval by USDA for pop materials could be a lengthy process.

For the preliminary test market, the DoW chose to use the words “Wolf-Country Approved,” and FSEEE chose “Nature Safe Approved” to go on the Heritage Ranch pop materials. The two groups’ approvals would appear as individual stickers on the pop materials. The use of the words “approved” rather than “certified” on the pop materials was permitted by the USDA. This eliminated the need for a lengthy evaluation of the third-party certification criteria by AMS. The pop materials that were developed for the market test include a tri-fold brochure, poster, and table tent. The brochure included panels that discuss the DoW and FSEEE approval programs. Currently, the two environmental groups are pursuing approval of their third-party certification programs from the USDA, independent of this project.

Two retail gourmet-natural grocery stores in Albuquerque participated in a month-long market test in which the beef was offered for sale as fresh ground at their meat counters. The Albuquerque Zoo also participated by selling beef patties in their restaurant. A kick-off event for Heritage Ranch beef was held at the Albuquerque Zoo at the onset of the market test. At the event, the rancher and representatives from the two environmental groups signed a memorandum of understanding with Heritage Ranch. Four thousand invitations to the event at the zoo were mailed to members of DoW, FSEEE, the Zoological Society, and to the grocery stores’ mailing list. More

than 200 people attended the event to partake in a free cookout that featured Heritage Ranch beef burgers, live music, and a howling contest for the children. The local media covered the event, and the mayor of Albuquerque spoke in support of the ranchers' endeavors.

A survey was conducted at the zoo kick-off event to determine participants' views on issues such as public land use, riparian protection, predator preservation, and consumer willingness to pay for beef products that foster these environmental attributes. A coupon, redeemable for \$.50 off each pound of beef purchased at the two participating retail stores, was attached to each invitation that was mailed. Analysis of sales and survey data from the market test is currently in progress. Heritage Ranch hired a marketing representative to pursue future retail venues.

Branding Locally Grown Fruit and Vegetables Via State Logos

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Small-scale independent fruit and vegetable growers that strive to market products to local retailers are constrained by many factors, one being the problem of delivering small volumes over a short period of time. The departments of agriculture in many states have developed logos to help growers sell their "locally grown" products to local consumers. At public farmer's markets, roadside stands, and on-farm-markets, these logos have been used occasionally to emphasize to consumers that fresh, locally grown products are available at these locations. To some degree, the intent is to place a brand label on certain products.

Interest in branding produce items in supermarkets seems to be at an unprecedented high. In order to entice retailers to expend the effort and money to purchase and display locally grown products, can state-logo campaigns effectively influence consumers to purchase these local products with a price-to-cost ratio that encourages the retailers to engage in the extra effort and, perhaps, the extra expense associated with raw-product procurement and display? Retailers who deal with limited-volume, short-season suppliers, like the growers in Tennessee, usually have to work with

several growers to obtain adequate volumes over the relatively brief in-state harvesting period. This procurement system is positioned directly opposite the industry move toward single-source suppliers, where a retail buyer deals with a wholesaler/shipper that will supply the retailer with a particular produce product(s) over an entire year—hence, the need for growers to have access to these major, large-volume wholesalers who procure the product from several geographic locations in order to maintain a year-round supplier relationship with the retailer.

Critical to the success of any "branding" campaign are the needs to, first, secure customer recognition of the logo and, second, to create customer desire for the branded products. A broad direct-marketing study, which is in progress, includes an objective to determine the recognition level of direct-market shoppers and area residents for Tennessee's logo and the impact that the logo could have if certain conditions were satisfied. Analyses of responses to questions about logo recognition, awareness, and preferences for in-state fresh produce will be described. Early results revealed the fact that well over one-half of the residents in Tennessee's metropolitan areas are not aware of the state's "Pick-Tennessee-Products" logo; however, an even larger percentage reported that they had not heard about the national "5-A-Day" campaign. On the positive side, as many as 82 percent of residents who responded to the survey indicated that they would show preference to products identified as locally grown by a "Pick-Tennessee-Products" logo or sign. Earlier studies have shown that consumers are willing to pay a premium price for high-quality local produce. Two other findings also seem to support retailers' encouragement to handle local produce during the local harvesting period. First, more than two-thirds of the respondents indicated that they shop at more than one store to take advantage of advertised specials. Perhaps locally grown produce could be promoted as a special product. The burden then is on the growers to be sure that the product delivered to the retailer is, in fact, a high-quality product. This notion is supported by the 40 percent of respondents who indicated that they would switch stores to take advantage of the availability of locally grown produce. Likewise, 68 percent of the respondents indicated that they would shop at more than one store for advertised specials. The marketing implication is that a large

segment of the food shoppers prefer to buy locally grown products when available. However, the vertically coordinated, and increasingly concentrated, supply-chain participants face serious obstacles in any effort to procure produce from small-scale growers.

Findings of Strategies Followed by the 28 Past Winners of the Malcolm Baldrige National Quality Award, 1988–1996

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Companies that have won the Malcolm Baldrige National Quality Award (MBNQA) are recognized for business excellence and quality achievement. For the fourth year in a row, the fictitious “Baldrige Index” has outperformed the Standard & Poor’s 500 by almost 3 to 1, according to the U.S. Commerce Department’s National Institute of Standards and Technology (*Westchester County Business Journal*, 1998). This study continues the work, the goal of which is to share information about successful performance strategies of MBNQA winners with companies in the food industry (Cangemi and Lopez, 1997, 1998).

The 28 award-winning companies were investigated in three categories in this study: manufacturing (15); small (6); and service (7). All of these companies’ Baldrige application summaries were perused to determine the frequency that each of the 11 core values was mentioned in each of the seven MBNQA award criteria. Overall (1), there were 1,308 citings of core values and concepts that were counted among the seven award criteria. Regarding manufacturing companies (2), there were 869 citings; small companies (3), 191; and service companies (4), 247. The percentages in which the core values were mentioned are as follows:

Employment Participation and Development

1 (14.7); 2 (14.7); 3 (12.6); 4 (16.2)

Customer-Driven Quality

1 (9.9); 2 (8.4); 3 (13.9); 4 (12.9)

Long-Range View of the Future

1 (12.0); 2 (12.8); 3 (11.5); 4 (9.7)

Partnership Development

1 (9.6); 2 (10.2); 3 (6.3); 4 (9.7)

Continuous Improvement

1 (11.6); 2 (11.5); 3 (15.2); 4 (8.9)

Management by Fact

1 (7.4); 2 (7.3); 3 (6.3); 4 (8.9)

Design Quality and Prevention

1 (11.5); 2 (11.7); 3 (14.7); 4 (8.1)

Leadership

1 (8.4); 2 (8.6); 3 (8.4); 4 (7.7)

Corporate Responsibility and Citizenship

1 (5.7); 2 (5.5); 3 (4.2); 4 (7.7)

Results Orientation

1 (2.6); 2 (1.6); 3 (2.6); 4 (6.1)

Fast Response

1 (6.6); 2 (7.6); 3 (5.2); 4 (4.1)

In summary, a relative analysis of the findings indicates that *all (1)* of the company categories expend great effort in managing their human resource asset although *small companies (3)* had the lowest percentage of citings. *Manufacturing companies (2)* had the lowest citings in results orientation but the highest in fast response. *Small companies (3)* were low in partnership development and management by fact but were the highest on customer-driven quality, continuous improvement, and design quality and prevention. *Service companies (4)* were very high on results orientation, and corporate responsibility and citizenship, but low on leadership, design quality and prevention, and long-range view of the future. The four most emphasized core values and concepts followed by the 28 MBNQA winners in descending order are: *employee participation and development; long-range view of the future; continuous improvement; and design quality and prevention*. Companies in the food business might take a cue from these findings and plan a quality management strategy that incorporates these tactics into their operations.

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Consumer Opinions Concerning Fresh Potatoes: Delaware, A Case Study

Khari A. Cook, Ulrich C. Toensmeyer, Carl L. German, and J. Richard Bacon; graduate student, professor, extension marketing specialist, and associate scientist, respectively; Department of Food and Resource Economics, University of Delaware

Introduction and Justification

Fresh potato production and marketing is still an important factor in Delaware agriculture. Consumer tastes and preferences have changed dramatically within the last 10 years. Specifically, consumers spend, on average, only 20 minutes preparing meals; thus, the need for convenience in food products that are available in different retail outlets exists. Given these changes, the Delaware Potato Board and the Department of Food and Resource Economics are jointly conducting a consumer survey of Delaware consumers concerning fresh potatoes.

Objectives

The overall objective of this study is to determine what factors have the most influence on the patterns of fresh potato purchases by Delaware consumers. Specific objectives are:

- (1) to determine the level of satisfaction with fresh potato purchases by Delaware consumers;
- (2) to determine how different uses of fresh potatoes impact consumers' purchases;
- (3) to determine the impact of nutrition on fresh potato purchases;
- (4) to determine how demographic characteristics affect fresh potato purchases; and
- (5) to make recommendations to Delaware potato producers based on the above findings.

Procedures

A questionnaire was mailed to 4,000 households in Delaware in August 1998. Inquiries consisted of the following: frequency of purchase of fresh potatoes; package size purchased; preferred package; preference for any particular state's product; favorite variety; changes in fresh potato purchases; storage problems; how used; level of satisfaction with fresh potatoes purchased; purchased substitutes and what kind; time spent preparing meals; and general and specific questions concerning nutrition as related to fresh potatoes.

Country-of-Origin Labeling of Foods from the Consumer's Perspective

Robert L. Degner and Susan D. Moss; professor and director, and economic analyst, respectively, Florida Agricultural Market Research Center, University of Florida

Adverse publicity resulting from food poisoning incidents has created a ground swell of political measures taken to promote food safety. Safety concerns have spawned at least five bills in the U.S. Congress during the past several years; these bills would require country-of-origin labeling for produce and meat. On July 16, 1998, the Senate passed the "Imported Produce Labeling Act" as an amendment to the agricultural appropriations bill. The House of Representatives bill did not include the country-of-origin amendment, and the House and Senate were unable to come to an agreement on this issue prior to the passage of the final agricultural appropriations bill.

Even though the pending legislation failed to pass, the issue is unlikely to fade into oblivion because of support by consumer activists and domestic agricultural producers. Country-of-origin labeling is an extremely controversial issue within the food distribution industry. Wholesalers and retailers tend to view labeling as unnecessary, costly, and difficult to administer while domestic producers view it as a positive marketing tool. Consumer activists support the right of citizens to know the origin of the food that they eat. To date, little quantitative research has examined country-of-origin labeling from the consumer's viewpoint. The University of Florida is conducting a telephone survey of randomly selected primary food shoppers to determine the degree of support for mandatory country-of-origin labeling for specific fresh and processed produce and meat items.

Attributes Important to Wine Sales in On-Premise Markets

Tim Dodd, Director, Texas Wine Marketing Research Institute, Texas Tech University

Although California produces about 90 percent of all U.S. wine and has approximately 800 wineries within the state, other regions also have a significant number of wineries. Today, 44 U.S. states have at least one winery within their borders, and

there are more than 500 bonded wineries outside of California.

Because of climatic conditions, some of these states with limited production will not develop significant wine industries, and just one or two small wineries will survive. In other regions of the country, however, there is the possibility of producing good-quality wines and greater opportunity for further expansion.

The growth of new wine industries in nontraditional wine-producing areas has necessitated that winery managers find ways to effectively distribute their wines to consumers. Many of the newly established wineries are not, at first, highly respected by some of the local supermarket store managers, wine retailers, and restaurateurs and, therefore, have considerable difficulty selling wine through these distribution outlets. This can occur despite their wines receiving top honors at various national and international wine competitions.

Wine sales to restaurants (on-premise sales) are particularly important to wineries as they provide legitimacy for new wine products, an opportunity for consumers to try new wine products by purchasing small quantities, and a profitable sales outlet. Despite the importance of restaurants, little is known about how widely these new wines are distributed, what restaurant wine buyers want from their suppliers, and how winery managers can better target this market.

Attributes of a product or service—such as price, quality, size, speed of service, and friendliness of employees—can play a critical role in forming attitudes toward that product or service. Marketers need to know which attributes influence attitudes and which do not. Otherwise, describing potentially irrelevant attributes in promotional materials or sales presentations may not interest buyers.

Although there are dozens of potential attributes that could be included in this research project, it will be critical to determine the most important ones in the decision-making process. Winery managers can then concentrate on these as they develop appropriate strategies to sell to restaurants. Attributes could include the wine quality, the label of the wine, various types of promotional support offered by the winery, and the many services offered by the distributing company.

The most relevant study concerning wine sales to restaurants in a newly developing, wine-producing state was undertaken by Ochsner (1984)

who studied the pricing, promotion, and product mix of wines sold to restaurants in Washington state. Despite the development of the Washington wine industry at that time and the growing reputation of the local wines, only 47 percent of the licensed restaurants within the state sold Washington wines. After analyzing the number of wines sold by these businesses, Ochsner (1984) concluded that Washington wineries had not penetrated, to a great extent, the local restaurant market. Despite this conclusion, no studies were found that examined the reasons for this lack of market penetration.

Little research has been conducted that has asked restaurateurs about the attributes that influence their attitudes and decisions to purchase a particular winery's products. In addition, there is no published information available concerning restaurateur perceptions of local wines from some of these states and the barriers to improving these wineries' competitive position in the market. If winery managers, wine distributors, and wine marketing associations that promote a region's wines can better understand the importance of various attributes, then management can focus on those attributes as they attempt to develop the restaurant market. The objective of this research is to contribute to a better understanding of this issue.

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The Effectiveness of U.S. Promotion Programs on the Export Demand for U.S. Pecans

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This study seeks to estimate the major factors affecting the export demand for U.S. pecans in Asia and the European Union, which jointly import about 27 percent of total U.S. pecan exports. The primary objective is to determine the impact of federal promotion programs on the foreign demand for U.S. pecans. Asia and the European Union represent large expanding markets for U.S. agricultural commodities and products. Thus, it seems increasingly important to place U.S. pecans

in the best possible competitive position for growth in these markets.

Many criticize the mode of allocation of federal funds, which to their belief, tend to overly favor large U.S. corporations to the detriment of small firms. They argue that large corporations could finance such promotions themselves. Supporters of federal funding to corporations assert that brand promotions help firms to increase or maintain exports in markets that they might not otherwise be able to enter, thus contributing to U.S. economic activity and growth.

Therefore, a need to systematically determine the effectiveness of promotion programs relative to the cost of the programs is essential to guiding the allocation of future funding. This is the first independent study to evaluate the effectiveness of promotion program expenditures on the export demand for U.S. pecans.

Evaluating Consumer Use of Food Advertisements: The Influence of Socioeconomic Characteristics

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Food advertisement is a frequently used and often powerful tool for positioning and promoting food products in a highly competitive market. While many studies have provided aggregate estimates of the effect of food advertisement on overall commodity demand, little research has created a profile of those who frequently make use of food advertisements. Determining which consumers are most likely to make use of food advertisements may be beneficial to increasing the success of advertising campaigns or to decreasing the cost of food marketing. Specifically, this analysis attempts to predict consumer usage of newspaper food advertisements and to decompose the effects of demographic characteristics that encourage consumers to make use of food advertisements.

The data for this analysis were collected from a survey conducted by Rutgers Cooperative Extension. The survey was administered at five grocery retailers throughout New Jersey and was completed in 1997. Only 22 percent of surveyed consumers

reported making frequent use of food advertisements when purchasing food products. However, certain demographic segments appear to place a greater emphasis on food advertisements than others. The results indicate that those with lower annual incomes and those with lower levels of education are more likely to make use of food advertisements in the newspaper. Variables denoting regional location suggest that those who reside in urban neighborhoods are less likely to make use of food advertisements than those who live in rural or suburban areas. Of the significant variables, regional location had the greatest magnitude effect on advertisement usage. Those living in rural and suburban areas were, respectively, 48 percent and 45 percent more likely to use food advertisement than were urban residents. The results also indicate that households with children, single individuals, and those over 65 years of age are less likely to use food advertisements.

Predicting Willingness-to-Pay for Integrated Pest Management Produce: A Logistic Approach

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Pesticide residue has repeatedly been documented as a leading source of food safety concern among consumers. While many studies have presented aggregate, descriptive illustrations of consumer response to Integrated Pest Management (IPM), consumer willingness-to-pay for IPM produce and the factors that determine such willingness have received relatively little research attention. This study documents the effect of sociodemographic characteristics on the willingness-to-pay a premium for IPM grown produce.

The data for this analysis was collected from a short consumer survey conducted by Rutgers Cooperative Extension. The survey was administered at five grocery retailers throughout New Jersey and was completed in 1997. Of the 291 participants that responded, 60 percent felt that pesticides posed a very serious risk to human health; 37 percent felt that pesticides were somewhat hazardous; and only 3 percent felt that they were not hazardous. Willingness-to-pay was not con-

stant across the population but varied among demographic segments. The results of this study suggest that many consumers would be willing to pay a premium to obtain IPM produce; specifically, females, higher-earning households, younger individuals, and those who frequently purchase organic produce appear to be among the most likely to pay a 10 percent premium for IPM produce. Conversely, households with four or more residents were 17 percent less likely to pay the 10 percent premium for IPM produce than were smaller households. If obtaining a premium was the primary goal for a retailer introducing IPM-labeled produce, affluent and suburban areas and places where organic produce is sold seem to be the most likely target areas. Two significant interaction variables also suggest that urban residents would be less likely to pay higher prices for IPM-grown produce. Larger households, which are also more prevalent in urban areas, seem less likely to pay a premium for IPM-grown produce. Communities that have a high population of retired individuals may have a lower willingness-to-pay for IPM than younger communities. However, before the level of acceptance and demand evidenced by this study can be realized, some form of educational mechanism must be implemented to inform consumers of the benefits and the existence of IPM.

Survey Update on Retail Marketing of Fruits and Vegetables Over the Internet

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A textbook definition of a market might be “the participation of a buyer and a seller in a mutual transaction.” In days gone by, the buyer and the seller needed to be in the same location for the transaction to take place. As technology changed, the possible distances between the buyer and seller increased. Today, with the Internet, many buyers and sellers are coming together from many different areas of the globe. “Currently, 62% of all packaged goods manufacturers have a presence on the Internet, up from 33% a year ago,” according to the *Consumer Goods Technology Study* conducted by the Computer Sciences Corporation, Waltham, Mas-

sachusetts. However, according to the *Food Institute Report* in January of this year, “companies have been slow to take advantage of the interactive features available through the Internet.” The *Food Institute Report* continues by stating that “regardless of the product segment, a large majority of the respondents to the survey said that their Web sites function strictly as an electronic brochure with little or no emphasis on relationship building or on-line commerce.”

With the ability of the Internet to help produce store-specific and corporate Web sites, many businesses—small and large—are looking to use the Internet for marketing. But what kind of marketing are these businesses doing? Specifically, are retail fruit and vegetable markets joining in and taking advantage of this new method of marketing their product?

Of a possible 17,894 fruit and vegetable marketers listed in an electronic phone book, a sample of 297 businesses was drawn. The sample size permits a 90 percent confidence level that the responses to binary (yes/no) questions would reflect the population of all fruit and vegetable marketers. A Web Ferret was used to locate the sites of the 297 businesses. The Ferret worked with seven different search engines that retail customers (consumers) would be likely to use. The following information was recorded: whether a site was found; whether the site was for the fruit and vegetable marketer alone or for several businesses; whether purchases could be made through this site; and whether a 1-800 number or E-mail capability was present.

Results indicated that approximately 4 percent of the businesses had their own Web page. Approximately 20 percent were listed on a central Web page with other businesses. This central listing was sometimes associated with the local Chamber of Commerce and was other times associated with a store chain’s main Web site. Only about 1 percent sold through the Web, and an additional 1 percent used the Web to advertise a 1-800 phone number or E-mail address where the customer could contact the retailer for an order.

These results appear to be consistent with the Food Institute’s report. The majority of surveyed retail Web sites indicate that store image-building, product information, and specific product advertising are most important. Consumer feedback and online shopping are considered less important.

Food Quality Management Systems: A Research Update

Neal H. Hooker, postdoctoral research associate, Center for Food Safety, Texas A&M University, and Department of Resource Economics, University of Massachusetts; Maury E. Bredahl, director, Center for International Trade Studies, and professor, Department of Agricultural Economics, University of Missouri; Julie A. Caswell is professor, Department of Resource Economics, University of Massachusetts

This research analyzes the impact of the adoption of quality management systems (QMS) on firm costs and overall system efficiency. The project, funded by a U.S. Department of Agriculture National Research Initiative grant, focuses on the development and operation of mandatory, voluntary, and quasi-voluntary QMS that affect the mix of quality and price delivered by companies. It analyzes the characteristics of quality systems mandated by governments, adopted voluntarily by companies, and required by such a large proportion of the market (quasi-voluntary) as to make their use a de facto standard operating procedure. New types of organization within and between companies are being encouraged by the increasing use of such QMS to monitor inputs, to control and enhance product quality, to simplify contractual relationships, to demonstrate compliance with regulations, and to institute trace-back capabilities for quality attributes.

This project will facilitate a better understanding of the impacts of mandatory, voluntary, and quasi-voluntary QMS through a coordinated analysis of key QMS; develop a model and survey instrument; coordinate the administration of surveys in the United States and the United Kingdom; and analyze the results. It will identify, describe, and measure changes in internal production (company), transaction (between company), and regulatory compliance costs associated with the adoption of QMS; identify and describe changes in firm strategies and incentives arising from the adoption of QMS, with a particular emphasis on the impacts on different sized firms; and compare these costs and strategies between food companies in the United States and the United Kingdom to determine if common trends exist. This update describes work from the earliest stages of the project and planned research.

U.S. Export Demand for Poultry Meat Products: A Bayesian Approach for Almost Ideal Demand System (AIDS) Model Estimation

Man-ser Jan, Chung L. Huang, and James E. Epperson, University of Georgia

The U.S. government has implemented several non-price promotion programs in international markets to increase export demand by providing services or information to current or potential buyers in targeted countries. During the last decade, producers of poultry meat products in the United States received the bulk of federal export assistance. This study is designed to investigate the effectiveness of non-price promotion programs for U.S. exports of poultry meat products. The Almost Ideal Demand System (AIDS) will be employed as a means by which to model the export demand for U.S. poultry meat products and to evaluate the effectiveness of the promotion programs. The data used for this study are quantities, poultry meat expenditures, prices, population, and export promotion expenditures collected for the 1986–1996 time period.

The use of conventional demand system estimation procedures with relatively small data sets often leads to counterintuitive and theoretically implausible estimates of price and income elasticities. Coefficient estimates frequently exhibit a lack of precision with wide variability and incorrect signs. Since these models have managerial relevance for aiding decision-makers, it is imperative to develop alternative procedures that will improve the “reliability” of the estimated coefficients. By borrowing strength across time periods (years) and the information of prior distributions, the Bayesian procedure provides a plausible way to reduce variability and to add flexibility to the demand system. Traditional estimation procedures will be discussed, and the Gibbs sampling procedure will be introduced as an alternative approach for estimating the demand parameters of the AIDS model.

Trade and Foreign Direct Investment in the U.S. Food Processing Industry

Mary A. Marchant, R. Munirathinam,
and Michael R. Reed, University of Kentucky

The signing of the North American Free Trade Agreement (NAFTA) and the Uruguay Round of the General Agreement on Tariffs and

Trade (GATT) marked significant progress in eliminating trade barriers faced by U.S. agriculture. NAFTA, in particular, is viewed as the natural progression toward a Free Trade Area of the Americas (FTAA). During the time that NAFTA negotiations occurred, and especially while the U.S. Congress was debating NAFTA, there were many estimates on the impact of NAFTA on the United States. However, none of those estimates looked at the possible structural changes that may occur when trade between countries is completely liberalized. It is the premise of this research that the best way to analyze such possible structural changes from free trade agreements is to analyze the effects of the first free trade agreement signed by the United States—the Canada-U.S. Trade Agreement (CUSTA). Interestingly enough, no comprehensive study has been performed on the effects of CUSTA on the U.S. food industry. If we do not understand our history, how can we expect to predict our future?

The CUSTA provides an excellent case study to use in examining the impacts of changes in international trade and foreign direct investment patterns resulting from a free trade agreement. It was enacted on January 1, 1989, with little fanfare in the United States. Projections indicated that its economic impact would be minimal since both countries were already developed, trade barriers between the countries were low, and there was little difference in the structure of most Canadian and U.S. industries. These sentiments were echoed for agriculture, in general, and for food processing industries, in particular. Yet U.S. agricultural exports to Canada experienced a dramatic one-time increase from CUSTA (from an average of \$1.8 billion per year during the pre-CUSTA years, 1986–1988, to an average of \$4.6 billion per year during the post-CUSTA years, 1990–1992) and faster export growth rates after enactment. Thus, both the level and growth rate for U.S. exports to Canada increased after CUSTA. Similarly, U.S. imports from Canada experienced both phenomena, though to a lesser extent.

The objectives of this research are 1) to document international trade and investment flows in the food industry between the United States and Canada, both pre- and post-CUSTA, and 2) to develop and quantitatively estimate models that statistically determine changes in trade and investment flows between the United States and Canada resulting from CUSTA. Trade

data from the U.S. Bureau of Census and investment data from the Bureau of Economic Analysis (BEA) were used to conduct this research in addition to data available from the Economic Research Service within the U.S. Department of Agriculture. A covariance statistical model, which incorporates basic supply and demand factors, was developed to explain trade flows between the United States and Canada and to determine if their impacts differed before and after CUSTA.

Research results assessed the impact of the Canada U.S. Free Trade Agreement on exports and the foreign direct investment of processed foods. Results indicated that U.S. exports to Canada more than doubled while Canadian exports to the United States nearly doubled after CUSTA's implementation in 1989. Regression results of the covariance model on panel data showed that U.S. and Canadian food processing firms appear to use both exports and foreign direct investments as complementary market access strategies. See Munirathinam et al. (1997, in press) for detailed results.

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New Uses For WIC Data: The Case Of Ethnic Food Preferences

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Background

The Women, Infants, and Children (WIC) Supplemental Nutrition program provides free nutrition education and food supplements for women who are pregnant, breastfeeding, or have just had a baby, as well as for children under 5 years of age. Applicants must meet certain income and health-risk criteria to be eligible for this U.S. Department of Agriculture (USDA)-funded program. The USDA has estimated that every dollar spent for

WIC saves three dollars of public Medicaid funds. In California, the State Department of Health Services administers WIC. The WIC program has accumulated substantial food redemption or purchase data on people of differing backgrounds that could facilitate various research projects. As an example of magnitude, about 50 percent of all baby formula sold in U.S. retail food outlets is bought by WIC participants' state-issued "food instruments." A major cereal manufacturer reported measurable sales increases when it changed its box size to conform to WIC-authorized quantities.

The California WIC program developed and maintains the Integrated Statewide Information System (ISIS)—which collects applicants' data, including family size, income, ethnicity, health history, and special nutrition needs. WIC clinic staff enter data directly into ISIS as they interview applicants. ISIS then creates or updates all records and, if the applicant is found eligible, prints out appropriate food instrument packages. Examples of foods that are provided by WIC are milk, eggs, iron-fortified cereal, fruit juice, and infant formula. WIC has contracts with grocers to accept the food instruments as payment for approved food items. The food instruments can then be deposited as checks in banks. Unlike food stamps, an ISIS-generated WIC food instrument states the specific food type and the amount for which it is redeemable, serving as a permanent record of what has been purchased. ISIS has won several awards for its information processing performance. A new ISIS data warehouse is now under development to facilitate timely research-oriented data access and manipulation.

Objectives

One research question that the ISIS data warehouse could help answer more fully is that of how WIC food preferences differ between persons of various national origins or ethnicities. One reason that issued food instruments are not fully redeemed is that certain food items are not normally consumed by some cultural groups that are served by WIC. Identifying such cultural consumption patterns would help WIC modify food instrument packages to more closely meet its participants' needs and preferences, thereby encouraging adherence to food intake recommendations. Obviously, these recommendations need to be followed in order for desired health benefits and public cost savings to be achieved.

Methodology

Ethnicity identification, as well as family language preference, is reported by WIC applicants and is captured in the data warehouse, which will also track food instrument issuance and redemption in order to determine "redemption deficits." A redemption deficit is a record of a food instrument issued but not redeemed. The WIC data warehouse tables will be readable by the Statistical Analysis System (SAS), which is a versatile software with many statistical applications. The SAS Categorical Data Modeling procedure (PROC CATMOD) could estimate the degree to which participant characteristics, such as ethnicity or family language preference, correlate with WIC participants' redemption deficits. Once a redemption deficit pattern is discerned to be peculiar to a given ethnic group, steps may be taken to find other food products that meet nutrition requirements and that minimize the redemption deficit.

Future Applications

Redemption deficit minimization is just one possible research application for the WIC data warehouse. Ethnic food preference measurement systems could also support research into food export market studies. Additionally, items in the data warehouse, such as WIC grocery store location and size, will be geocoded so as to augment multi-purpose geographical information systems. Those of us involved with the WIC data warehouse are looking forward to facilitating a variety of timely food consumer behavior research projects.

A Food Industry Forecast

John L. Park and Edward W. McLaughlin, Food Industry Management Program, Cornell University

An understanding of the trends that affect the food industry is a key concern of researchers and industry decision-makers alike. However, reliance on historical data is often impractical in defining emerging trends that shape the frontier of food marketing. Through the use of a modified Delphi technique, the authors surveyed 55 senior-level executives in the retail food industry. The respondents were presented 52 scenarios that could potentially impact the operation of supermarket

companies. The scenarios cover topics—such as technological development, industry structure, supplier/distributor relations, competition, merchandising, fresh foods, branding, and environment. The respondents indicated how soon they believed each scenario would take place—before 2003, after 2003, or never.

From these initial results, those scenarios that showed a high degree of consensus were selected for further analysis. These results were, in turn, presented to the respondents again, and they were allowed to refine their responses. In particular, they were asked to indicate the probability that the given scenario would occur and then to indicate the impact that this scenario would have on industry practices. Selected results are described below.

Respondents predicted that, with 87 percent probability, in most leading supermarket companies, “category managers” would be responsible for total category bottom line by the year 2003. Further, respondents indicated the impact that this would have on industry practices with a mean response of 3.8 on a five-point scale (1=no impact, 5=dramatic impact).

Respondents predicted that, with 82 percent probability, scanning data would be the basis for nearly all shelf allocation and buying decisions by the year 2003. Further, respondents indicated the impact that this would have on industry practices with a mean response of 3.6 on a five-point scale (1=no impact, 5=dramatic impact).

Respondents predicted that, with 85 percent probability, nearly 100 percent of purchase orders would be executed via various electronic systems, for example, Universal Communication Standard and Electronic Data Interchange, by the year 2003. Further, respondents indicated the impact that this would have on industry practices with a mean response of 3.8 on a five-point scale (1=no impact, 5=dramatic impact).

In addition, respondents provided a forecast of the distribution of supermarket sales within the general supermarket departments. Among those categories forecasted for growth by the year 2003 are Produce, Deli, and Bakery. Meanwhile, Dry Grocery and Meat are among those categories forecasted to decline in their share of supermarket sales.

Consumer Selection for and Knowledge of the Nutrient Content of Fresh Meats

**Alvin Schupp, Jeffrey Gillespie, and Jose Agüero,
Louisiana State University**

Passage of the Nutrition Labeling and Education Act (1990) established guidelines for the voluntary nutrition labeling of packaged fresh meats or the presence of point-of-purchase nutrition information at the retail meat counter. This Act greatly increased the nutrient information available to the fresh meat consumer. Based on a survey of Louisiana households, research reported in this paper identifies the nutrients that consumers want labeled on fresh meats and, based on an ordered profit analysis, the influence of socioeconomic characteristics of households on the importance of labeling the content of fat and cholesterol in cuts of specific species of fresh meats. The significant variables for fat were age, education, income, and attempt to control fat and cholesterol in daily meals; the significant variables for cholesterol were age and attempt to control fat and cholesterol in daily meals. The respondents also identified the cut of meat that was highest in fat (cholesterol) among three cuts of meat for three groups of fresh meat. As expected, respondents were more knowledgeable of fat content than they were of cholesterol content.

Produce The Safe Way

Cheryle Jones Syracuse, Christine Taylor, and Barbara James; associate professor, extension agent, and professor, respectively; Ohio State University Extension

There have been few food-borne disease outbreaks in the United States associated with fresh produce; however, the same bacteria that can make an undercooked hamburger deadly can contaminate fruits and vegetables. These occasional outbreaks make national news and can cause consumers to reduce or eliminate their consumption of a produce item until their confidence in that item is restored. This downturn in sales can be disastrous for the food enterprises involved.

“Produce the Safe Way” was a pilot project that provided consumers with point-of-sale information on the produce selection, safety, and stor-

age of 12 common fruits and vegetables. Approximately 36,000 informational cards were distributed to consumers through 36 roadside markets in 20 of Ohio's 88 counties throughout the 1998 growing season. Cards were displayed in a plastic holder printed with the Ohio State University Extension logo and placed at a prominent location in the market. The cards addressed concerns of *Escherichia coli* 0157:H7, *Cyclospora cayetanesis*, parasites, pesticides, microorganisms, and fungi. The purpose of these cards was not only to provide consumers with information but to assist roadside, markets in promoting fruits and vegetables as a safe and important part of a family's diet and to assist these businesses in answering questions on the safety of their products.

Twenty-five farm market owners were interviewed to determine their satisfaction with the program and the impact of the informational cards. Thirty-five interviews were also conducted with customers at two markets.

Of the farm market owners interviewed, 68 percent indicated that customers were concerned about produce safety. Customers' biggest concern was pesticide sprays. Eighty-four percent of the farm market owners thought that the fact sheets would be helpful to their customers in answering questions regarding safety and storage. They said that the fact sheets helped customers learn how to wash their produce; provided market owners and consumers alike with information that they could refer to later; and helped customers to feel better about the produce that they purchase. Sixty-four percent of the market owners said that they themselves learned more about produce safety.

Of the farm market owners interviewed, 72 percent reported that the fact sheets helped them to market their produce as safe and wholesome, with 24 percent identifying that the fact sheets helped them to sell more produce. These roadside marketers said that they sold more corn because few consumers knew that they could store the new varieties up to five days in the refrigerator and still maintain quality.

An important part of the program evaluation was to identify changes that needed to be made in the writing or distribution of the fact sheets before they were released for national distribution. Most roadside market operators were positive about distributing the materials. Only three market owners did not distribute the fact sheets because they felt that the information would frighten customers and hurt sales. The fact sheets were most popular among

Amish market owners. Very few changes were suggested in the writing of the fact sheets. However, there was an indication that more information should be provided on the pasteurization of cider. The most common criticism on distribution was that customers were reluctant to take the materials home.

Marketers who pulled the cards out of the holders and stuffed them among the produce had the most success with distribution. Several marketers actually put the cards in the bags of produce at the check-out counter.

Another aspect of this project was an educational program conducted at the Ohio Roadside Marketing Conference. Educators discussed points of contamination in the picking, storage, and display of produce. A written evaluation followed the lesson. Ninety-percent of the participants felt that produce safety is important to consumers and is an important issue at their markets. These business owners supported the distribution of the fact cards at their markets.

"Produce the Safe Way" will be made available in 1999 to roadside markets and supermarkets through the Cooperative Extension System throughout the United States. This project is part of an ongoing effort utilizing CSREES-USDA funds to expand resources on food safety education and to educate consumers and the food industry about safe food handling and storage.

Impact of Chain Store Expansion on Mexican Produce Distribution Practices

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Project Overview

The objective of the project is to develop a body of mutually beneficial research on the

changing structure of Mexican distribution channels for fresh fruits and vegetables, and to investigate the ramifications of the growing influence of supermarket and chain store retailing in the distribution and marketing of perishables to final consumers. The ongoing investigation of produce marketing channels in Mexico involves the collaboration of three separate agencies:

- Asia-Western Hemisphere Branch, U.S. Department of Agricultural/Economic Research Service (USDA/ERS);
- Marketing and Transportation Analysis Program, U.S. Department of Agriculture/Agricultural Marketing Service (USDA/AMS); and
- Agricultural Planning Agency, Mexican Secretariat of Agriculture, Livestock, and Rural Development (SAGAR).

The primary interest of *ERS* is to understand and analyze the economic forces that drive structural change in Mexican produce markets and the impact of such change on Mexican producers and consumers for the benefit of the U.S. and international research community.

The primary interest of *AMS* is to investigate the logistical and operational aspects of distributing and marketing perishable products in Mexico in order to inform U.S. growers and shippers about current marketing conditions, customer preferences, and emerging market opportunities for specific U.S. products.

The primary interest of *SAGAR* is to evaluate the impact of growing supermarket influence in Mexico on wholesale and retail buyer requirements in order to develop policies and initiatives that may enable smaller fruit and vegetable producers in Mexico to compete more effectively in the local marketplace.

All of the agencies involved in the USDA/SAGAR Market Information and Policy Analysis project have agreed to share relevant market research data, industry contacts, and technical expertise, and to contribute to the development of a final research document.

Status of Research

The first stage of market research was completed in March 1998 during two weeks of field

interviews by AMS, ERS, SAGAR, and Texas A&M University economists. (The latter are working on the project through a cooperative agreement with AMS.) SAGAR personnel arranged interviews with the following:

- produce buyers from four of the largest convenience and supermarket chains in Mexico, three of which operate in separate regions of the country, and one of which operates throughout northern and central Mexico;
- produce merchants and brokers who operate at two of the top three central wholesale produce markets in Mexico (Mexico City and Monterrey);
- produce packers, assemblers, and handlers operating in the major vegetable production region of Sinaloa; and
- selected government officials who are responsible for gathering and analyzing data on wholesale and retail produce marketing in Mexico.

The research appears to be quite timely since the supermarket and chain store sector in Mexico is expanding very rapidly—with the most rapid growth occurring among the firms that operate the largest retail facilities. According to the latest figures available from ANTAD (Mexico's National Association of Self-Service and Department Stores), the number of retail chain stores selling grocery merchandise in Mexico totaled approximately 1,976 as of January 1998. (This figure excludes those chain drug stores, department stores, and other chain store operations that specialize in non-food items.) This broad category includes the following food retailers and mass-merchandisers.

- *49 megamarkets*, which offer consumers a full line of merchandise (groceries, perishables, clothing, and general merchandise), in a sales area exceeding 10,000 square meters (approximately 108,000 square feet). Fifty-five percent of these megamarkets (27 stores) are operated by Wal-Mart's Mexican subsidiary while more than 20 percent (11 stores) had only opened since February 1997.

- 437 *hypermarkets*, which offer consumers a full line of merchandise (groceries, perishables, clothing, and general merchandise), in a sales area between 4,500 and 10,000 square meters (approximately 48,000 to 108,000 square feet). At present, the number of hypermarkets in Mexico currently surpasses the number of conventional supermarkets—22 of these hypermarkets, 5 percent of the total, have only opened since February 1997.
- 395 *supermarkets*, which primarily offer consumers groceries and perishables, in a sales area ranging between 500 to 4,500 square meters (about 5,400 to 48,000 square feet). Nineteen of these supermarkets—just under 5 percent of the total—had only opened since February 1997.
- 948 *convenience stores*, which are generally open 24 hours a day and offer consumers a limited selection of food and beverages in a store with fewer than 500 square meters (approximately 5,400 square feet) of sales area. In Mexico (unlike the typical practice in the United States), most convenience stores have a small display area for perishable fruits and vegetables, including such staple items as avocados, bananas, onions, limes, and apples. Fifteen convenience stores—just under 2 percent of the total—had only opened since February 1997.
- 134 “*bodegas*” (similar to a warehouse/economy format store), which offer consumers a broad line of products at discount prices and provide few, if any, amenities and services. Sales areas generally exceed 2,500 square meters (approximately 27,000 square feet). Two new “bodegas”—1.5 percent of the total—had only opened since February 1997.
- 13 “*membership club*” stores, which handle a full-line of products (groceries, perishables, clothing, and general merchandise) and specialize in bulk-packaged products. All of the stores in this category are currently operated by Price Club’s Mexican subsidiary.

The modernization of the Mexican retail marketplace appears to be having a profound impact on the buying habits and preferences of household consumers. According to surveys conducted by the Food Marketing Institute, ANTAD,

and the Gallup Organization in 1996, nearly one-fourth (23 percent) of Mexican consumers reported that they relied on supermarkets and other “self-service” stores as their *major* source for fresh produce, presenting traditional public and open-air markets with significant direct competition for the retail produce markets. (The 1996 figures indicated that the largest segment of Mexican consumers—41 percent—still relied on open-air markets [*tianguis*] as their primary source for fresh fruit and vegetable purchases.)

Given the rapid expansion of supermarket and mass-merchandise chain store outlets that has taken place in Mexico during the past couple of years, it would not be surprising if the percentage of Mexican consumers who currently rely on “self-service” stores as their primary source for fresh produce were higher than the 1996 figures suggest, especially in light of the aggressive produce merchandising strategies being pursued by several of the major supermarket and chain store operations in Mexico. During interviews with administrators of the central produce wholesale market in Monterrey, Mexico, in March 1998, members of the research team learned that local supermarkets and other chain stores were using produce items as a loss-leader—offering some produce items *at or below wholesale prices* one or two days a week—to encourage consumers to patronize self-service stores instead of traditional public and open-air markets.

Despite recent attempts to introduce state-of-the-art merchandising of perishables on the retail level, however, limitations in physical infrastructure and inadequate regulation and enforcement of quality standards have made it very difficult for even the largest chain store firms operating in Mexico to maintain perishables in optimal condition throughout the distribution process or to effectively streamline their procurement of fresh fruits and vegetables by reducing dependence on intermediaries in the marketing channel. Listed below are some of the obstacles to efficient distribution noted by members of the project team during a field visit to wholesale and retail facilities in Monterrey, Culiacan, and Mexico City, Mexico, in March and April 1998.

Direct Shipments from Origin Still Problematic

Although retail buyers for Mexican supermarket and chain store operations report some success

in implementing direct buying programs with growers—one produce buyer for a large supermarket chain in northwestern Mexico noted that he had reduced his dependence on the central wholesale market for produce supplies from 60 to 25 percent within the previous four years by expanding his direct shipments from growers. Most retail buyers in Mexico noted that few domestic growers were capable of supplying product on a *regular* basis, which met their requirements for uniformity, quality, packaging, and refrigeration. In the absence of effective quality control at the farm level, produce wholesalers and brokers in Mexico still provide an important function in sorting, packing, holding product in cold storage, and delivering product to large retail firms.

*Sophisticated Growers Still Regard
the Domestic Market as a Residual Market*

Mexican growers who utilize the best post-harvest methods and highest level of technology typically give priority to the export market, restricting the volume of quality merchandise available to local supermarkets and chain stores. While visiting a couple of vegetable packing facilities in Culiacan, members of the research team observed that export-grade tomatoes were being packaged in sturdy, protective cardboard cartons while tomatoes that did not make export grade (and were, therefore, destined for distribution in the local Mexican market) were often packed and transported in overfilled wooden crates.

*Quality Standards Are
Insufficiently Defined and Enforced*

Unreliable quality standards were the single, most frequent complaint expressed by Mexican produce industry representatives. The lack of objective enforcement of quality standards leads to tremendous marketing inefficiencies, including:

- frequent price disputes;
- need for an intermediary to classify, sort, and select product before retail sale;
- reluctance among buyers to utilize suppliers without firsthand inspection of their products; and
- reluctance among growers to sell product without immediate cash payment.

The unwillingness of buyers and sellers to engage in long-distance transactions in the absence of effective quality control mechanisms at the farm and regional level has reportedly led to a phenomenon known as “product tourism,” whereby certain perishable products are occasionally shipped from a growing area to a central market in a major metropolitan city, only to be purchased by retail buyers and transported back to retail outlets in the same region where the goods were originally produced.

Restricted Availability of Refrigerated Vehicles

Access to refrigerated vehicles to transport produce still remains extremely limited, especially during peak harvest periods. The growth in refrigerated transportation services has not kept pace with the rapid expansion of supermarket outlets. One buyer for a major supermarket chain in northern Mexico mentioned that he actually had to lease trucks from one of his primary supermarket chain competitors because he could not reserve enough refrigerated truck space with independent trucking firms.

*Poor Control Over Perishable
Merchandise in Transit*

It is common for vegetable packers in production areas to arrange and to pay for the refrigerated shipment of a truckload to a destination market but to have no further contact with the truck once it leaves the packing shed. Temperature recording devices are not routinely installed on refrigerated vehicles, and violations of recommended temperature ranges by truck drivers are said to be frequent.

*Central Wholesale Market Facilities
Not Equipped to Handle Universal
Refrigeration of Perishables*

Although certain items—especially those destined for the export market, such as grapes and avocados—are typically packed in protective cartons, palletized, and kept in cold storage, there are many perishable items that are almost always stored at ambient temperature, such as oranges, papaya, pineapple, jicama, watermelon, potatoes, and onions. In the Monterrey central wholesale produce market, for example, only 50 percent of

the produce handled by the market was kept in cold storage.

*Limited Use of Mechanization
for Loading and Unloading
at Central Wholesale Market Facilities*

Many vehicles entering Mexican wholesale markets for pickup and delivery (for example, small trucks, passenger cars) are not the same height as the loading docks, with the result that much loading and unloading at central market facilities is done by hand, box by box. Even at wholesale facilities in Mexico City where merchandise was palletized, the truck was the same height as the loading dock, and forklifts seemed to be available. Members of the research team observed cargo being loaded onto a truck by hand.

The current inadequacy of cold chain maintenance and product handling for fresh fruit and vegetables in Mexico reportedly lead to extensive product losses throughout the produce distribution process: Mexican wholesalers cite typical fresh produce losses of 15 percent, and supermarket receivers cite losses of 5–10 percent.

Future Endeavors and Research Products

To complete the work already initiated, the members of the research team are planning a follow-up visit to Mexico in December 1998, to San Antonio and Laredo, Texas, and to Nuevo Laredo, Guadalajara, Mexico City, Veracruz, and Villahermosa, Mexico. Team members expect to collect information from a broad range of wholesale and retail produce industry representatives in various regions of Mexico in order to identify:

- availability and costs of refrigerated transportation and storage for domestic and U.S.-origin fresh fruits and vegetables entering the Mexican marketplace;
- differences in produce distribution channels, quality requirements, and product acceptance within various regions of Mexico (Some industry observers estimate that the percentage of fresh produce purchased by consumers in supermarkets and chain stores ranges all the way from 90 percent in northern border towns to less than 10 percent in Chiapas.); and

- emerging opportunities for U.S.-origin horticultural products in specific regions of Mexico created by supermarket/chain store expansion and changing buyer/consumer preferences.

It is currently anticipated that a first draft of the final research report will be completed at the end of first quarter 1999.

***Potential for Marketing Pacific Northwest
Wheat Using Contract Specifications***

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sity, Pullman, Washington**

World wheat markets tend to be dominated by many suppliers of different wheat classes that compete for the sale of their commodity; therefore, each supplier country and specialized production region is especially pressured in terms of price. However, quality, timing of deliveries, consistency of supply, ability to meet changing needs of industry, and changing consumer tastes and preferences are also of importance in wheat and other grain marketing. This competition in food and commodity markets is a constant force, precipitating changes in U.S. wheat production, milling, and baking industries. Some milling industry firms are increasingly interested in purchasing wheat that is differentiated by class, protein content, gluten consistency, and other milling characteristics instead of commodity wheat graded simply according to U.S. Department of Agriculture (USDA) standards. The Pacific Northwest (PNW) wheat industry is especially interested in the possibility of growing specific wheats to meet needs predetermined by buyers because of the region's specialization in Soft White Wheat production. This class of wheat is already preferred by bakers of products, such as crackers, pastries, and oriental noodles.

PNW wheat exports accounted for almost one-third of total U.S. wheat exports in the late 1980s. Estimates of the PNW wheat crop that is currently entering export markets range to greater than 90 percent of total production. Wheat produced in the PNW states is primarily shipped to overseas markets in central and east Asia, with

Pakistan accounting for the largest share among importing nations of PNW wheat in recent years. Domestic distribution of PNW wheat is secondary to the international markets although there may be potential to increase domestic usage if specific end uses are more specifically targeted. There may be potential to use direct contracts between grain producers and end users of grain, both here and abroad, to achieve a better match between the characteristics desired by buyers and those that are currently being supplied.

The overall objective of this research is to determine the feasibility of marketing soft white wheat tailored to specific end-user needs by means of contractual agreements between producers and purchasers. Potential for using such production contracts is of special interest because this method provides greater assurance of a buyer for the grain than do current marketing practices, thus

shifting the risks taken in producing, processing, and marketing wheat and wheat mill products.

To achieve these objectives, interviews will be conducted with grain exporters, flour millers, and bakers in the PNW. These interviews will help to determine the degree to which bakers, millers, and exporters currently specify wheat characteristics in addition to the standard USDA grades. Additionally, the interviews will provide insight into what specific characteristics would be important to specify were direct contracts written between producers and buyers.

Results of this research will provide a benchmark for the PNW wheat and milling industry concerning the potential to use direct contracts for marketing differentiated wheats. The industry will be able to use the results in adjusting their marketing strategy in response to buyer needs for more specific inputs into the milling and baking process.

