Changes in the Nutritional Quality of Food Products Purchased

The analysis of nutritional change in products offered for sale at the supermarket does not address directly the issue of the nutritional quality of food products that were actually bought by consumers. Sales data are required to determine whether the nutritional quality of foods purchased changed in the examined period. To incorporate sales information, the Padberg index analysis was extended by calculating the market share of each brand in the supermarket data for each year based on its national sales values. Total national sales of the brands in the supermarket data were used as the universe for market share calculations for individual products. Market shares were then multiplied by the brand-level nutrition index values to obtain individual weighted values. The sum of these values gave the market share-weighted average nutrition index. Weighing by the market share of each brand rather than using the unweighted index takes into account not only what was offered for sale by manufacturers but also what was sold.

The sales-weighted index results presented here should be interpreted as preliminary due to limitations in the data used. As noted above, it was necessary to calculate the weighted results using products included in the supermarket-based nutrition data and sales from national scanner data. Differences in the two data sources resulted in unmatched data, which made tests of statistical significance impractical. Therefore, the results in this section are preliminary, while showing how the methodology can be used.

Mean-Weighted Index Values of Nutritional Quality and Quality Change

Table 13 shows the unweighted mean nutrition index values for the matched products between the supermarket and scanner data sets. Table 14 shows the market share-weighted nutrition index values and changes in values for these same matched products in the selected food product categories and time periods. In every case, the market share-weighted index values are smaller than the unweighted mean index values for the matched products. This suggests that, for this data set, sales were higher for food products that had poorer than average nutritional profiles. The decline observed in the market share-weighted index values for entrees and cookies also suggests that the average nutritional quality of products purchased by consumers in these

Table 13—Unweighted nutrition index values and changes by year and category for matched products purchased, selected years, 1992-97

	Mean unweighted index					Point changes					
Food category	1992	1993	1994	1995	1997	1992-93	1993-94	1994-95	1995-97	1994-97	1992-97
Entrees	—	—	38.8	36.5	35.3	—	—	-2.30	-1.20	-3.50	—
Soup	—	—	—	46.8	47.4	—	—	—	.60	—	—
Salted snacks	—	—	54.9	56.0	57.2	—	—	1.10	1.20	2.30	—
Cookies	—	—	62.8	62.4	61.4	—	—	-.40	-1.00	-1.40	—
Processed meats and bacon	39.0	41.6	41.3	40.8	42.7	2.60	-0.30	-.50	1.90	—	3.70

— = Not available.

Table 14—Market share-weighted nutrition index values and changes by year and category for matched products purchased, selected years, 1992-97

	Weighted index					Point changes					
Food category	1992	1993	1994	1995	1997	1992-93	1993-94	1994-95	1995-97	1994-97	1992-97
Entrees	—	—	32.3	29.8	29.1	—	—	-2.50	-0.70	-3.20	—
Soup	—	—	—	41.9	42.3	—	—	—	.40	—	—
Salted snacks	—	—	49.7	50.4	51.0	—	—	.70	.60	1.30	—
Cookies	—	—	58.5	58.2	58.0	—	—	-.30	-.20	-.50	—
Processed meats and bacon	33.3	34.8	35.3	34.8	36.1	1.50	0.50	-1.50	1.30	—	2.80

— = Not available.

food categories was declining over the years studied (table 14). On the other hand, for soup, salted snacks, and processed meats and bacon, the increase in the market share-weighted index values over the entire time period studied implies that the nutritional quality of products purchased by consumers in these food categories was increasing.

To explore the results further for entrees and cookies, where the market share-weighted index values decreased, the brands for all matched products were divided into those with unweighted index values above and below the mean index value. This approach allows us to identify a group of relatively more nutritious and a group of relatively less nutritious products the characteristics of which can be compared. The goal of this part of the analysis is to explain the values of the weighted nutrition index and to show what was happening to the components of the weighted index: unweighted mean nutrition index values, total sales values, and market share values.

Tables 15 and 16 present the measured variables (unweighted mean index, mean price, total sales, mean sales, total market share, mean market share, and number of matched products) for entree and cookie brands in the more and less nutritious groups. The unweighted mean index values show consistent decline between the years 1994 and 1997 for all matched products, as well as for those with above- and below-average index values, with the exception of an increase for below-average cookies. The above/below ratio for mean price reveals similar prices for below- and above-average products in the years studied. The above/below ratio for total sales for entrees is decreasing over the whole period examined. This ratio for cookies shows a decline in 1995 and an increase in 1997. Average sales of entrees and cookie brands show that brands in the below-average group seem to be larger sellers on average than brands in the above-average group.

The below-average entree and cookie products held most of the market share. The above/below market share ratio falls over time, suggesting that, for this data set, the market share of more nutritious products was falling relative to less nutritious products from 1994 to 1997. These results are consistent with the decrease in the market share-weighted index values as well as the relationship of the market share-weighted values to the unweighted mean values for all matched entree and cookie brands. During the period studied for entrees and cookies for the products matched, both average nutritional quality was declining and the market share of products with below-average quality was increasing.

Table 15—Purchased entrees with above- and below-average nutritional quality: Mean index values, prices, sales, and market shares, 1994-97

Variable	1994	1995	1997[1]
		Index	
Unweighted mean index value:[2]			
All matched products	38.80	36.47	35.28
Above-average index value	56.30	52.57	52.08
Below-average index value	24.20	26.00	23.15
Ratio (above/below)	2.33	2.02	2.25
		Dollars	
Mean price:			
All matched products	2.26	2.60	2.70
Above-average index value	2.20	2.70	2.70
Below-average index value	2.30	2.50	2.70
Ratio (above/below)	.96	1.08	1.00
		Million dollars	
Total sales:			
All matched products	334.00	414.00	414.00
Above-average index value	96.00	92.00	89.00
Below-average index value	238.00	322.00	325.00
Ratio (above/below)	.40	.29	.27
Mean sales:			
All matched products	11.10	12.40	12.80
Above-average index value	.75	.60	1.00
Below-average index value	14.00	15.30	14.00
Ratio (above/below)	.05	.04	.07
		Percent	
Total market share:			
Above-average index value	0.30	0.27	0.25
Below-average index value	.70	.73	.75
Ratio (above/below)	.43	.37	.33
Mean market share:			
All matched products	.03	.03	.03
Above-average index value	.02	.02	.02
Below-average index value	.04	.04	.03
Ratio (above/below)	.50	.50	.67
		Number	
Matched observations	30.00	30.00	36.00

[1]Scanner data for 1996 were matched to supermarket data for 1997.

[2]Information from matched products was used for all calculations.

Table 16—Purchased cookies with above- and below-average nutritional quality: Mean index values, prices, sales, and market shares, 1994-97

Variable	1994	1995	1997[1]
		Index	
Mean index value:[2]			
All matched products	62.82	62.41	61.40
Above-average index value	68.27	67.95	67.35
Below-average index value	54.34	54.74	54.70
Ratio (above/below)	1.26	1.24	1.23
		Dollars	
Mean price:			
All matched products	2.31	2.41	2.48
Above-average index value	2.33	2.43	2.44
Below-average index value	2.27	2.37	2.53
Ratio (above/below)	1.03	1.03	.96
		Million dollars	
Total sales:			
All matched products	271.00	330.00	367.00
Above-average index value	79.00	75.00	90.00
Below-average index value	192.00	255.00	277.00
Ratio (above/below)	.41	.29	.32
Mean sales:			
All matched products	11.80	11.70	11.70
Above-average index value	5.60	5.20	6.00
Below-average index value	21.30	20.00	17.40
Ratio (above/below)	.26	.26	.34
		Percent	
Total market share:			
Above-average index value	0.29	0.23	0.22
Below-average index value	.71	.77	.78
Ratio (above/below)	.41	.30	.28
Mean market share:			
All matched products	.04	.03	.03
Above-average index value	.02	.01	.02
Below-average index value	.08	.06	.07
Ratio (above/below)	.25	.17	.29
		Number	
Number of matched observations	35.00	34.00	38.00

[1]Scanner data for 1996 were matched to supermarket data for 1997.

[2]Information from matched products was used for all calculations.

Summary of Findings: Food Products Purchased

To reflect the quality of goods purchased by consumers, nutrition index values must be weighted by national sales data. National sales scanner data were used to calculate the market share of each brand in the supermarket data for each year based on its national sales values. The total national sales of the brands in the supermarket data were used as the universe for market share calculations for individual products. For the matched products, the market share-weighted indexes were smaller in each year than the unweighted mean indexes. This implies that sales were higher for food products that had poorer nutritional profiles. For entrees and cookies, the decline observed in the market share-weighted index values from 1994 through 1997 shows that the nutritional quality of products purchased by consumers in these food categories was declining. For soup, salted snacks, and processed meats and bacon, an increase in the market share-weighted index values shows that the nutritional quality of products purchased by consumers in these food categories was increasing.

Finally, the entree and cookie brands were analyzed in two categories: those products with above-average nutrition index values and those with below-average nutrition index values. The market share ratios of products with above-average to those with below-average nutritional quality support the finding that, for this data set, sales were higher for products with poorer nutritional quality. The relatively less nutritious entree and cookie products gained a higher percentage of market share in each year. From the market share-weighted index values for 1994, 1995, and 1997, we can conclude that not only were sales higher for relatively less nutritious products among entrees and cookies but that the nutritional quality of products purchased by consumers was declining.