An Exploration of the Relationship Between Income and Eating Behavior

Susan E. Chen, Jing Liu, and James K. Binkley

This paper explores the relationship between income and eating behavior. To do this we examine choice in two food categories: milk and soft drinks. These categories have varieties differing in health qualities but either no differences in cost or lower cost for the healthier types. By examining food choices when there are no measurable cost differences but clear health differences, we are able to isolate the association between income and healthy eating behavior. We find a negative association between income and dietary intake of higher-calorie types of milk and soft drinks. Our estimates are consistent across the five sets of the National Health and Nutrition Examination Survey and the Continuing Survey of Food Intakes by Individuals data that we study. For 2005 we estimate that an income increase of $10,000 is linked to a reduction in 377 calories from milk and 2,555 calories from soft drinks per year. Our results suggest that the cost of food may not be the only reason why low income people have less healthy diets.

Key Words: health behavior, healthy eating, low income, milk, soft drinks

Concern by the U.S. Department of Agriculture (USDA) with the composition and cost of a healthy diet has a long history. Recent emphasis has also been placed on nutrition education, which has led to improvement in some aspects of the American diet. Despite these efforts, however, "Low income households tend to eat less nutritious diets than other households" (Golan et al. 2008). As a result, they have a greater incidence of nutrition-related health problems, especially obesity and diabetes (Robbins et al. 2001). Why this is the case is unclear. In this paper we examine the relation between food choice and income.

Some have argued that the very programs designed to eliminate food insecurity are also structured to encourage overconsumption (Shapiro 2005, Wilde and Ranney 2000). However, investigations of the relationship between obesity and programs such as food stamps have generated mixed results (Chen, Yen, and Eastwood 2005, Gibson 2003, Ver Ploeg et al. 2007).

Another possibility is the existence of "food deserts." Many believe that low income households tend to live in areas having limited access to nutritious foods, especially fruits and vegetables, but relatively easy access to energy-dense, nutrient-poor foods (Moore and Diez Roux 2006, Morland, Wing, and Diez Roux 2002, Zenk et al. 2005). Indeed, studies have found a positive association between low income neighborhoods and the location of fast food outlets (Chou, Grossman, and Saffer 2004, Jeffery et al. 2006). However, businesses tend to locate where they expect to make a profit, which confounds the relationship between access to food and income. As a result, not accounting for these types of selection issues in the estimation process can lead to spurious correlations between access and income.

An oft-cited reason for poor eating patterns among low income households is the cost of healthy food (Cassady, Jetter, and Culp 2007, Drewnowski 2003, Reicks, Randall, and Haynes 1994). This is based on the observation that the least expensive sources of calories are energy-dense foods with high oil and sugar content, and the perception that fruits and vegetables are particularly high in cost (Drewnowski and Specter 2004). However, this is a dubious criterion. In a world of excessive calories, their shadow value is negative. Also, the same argument applied to vi-

Susan Chen is Assistant Professor in the Department of Economics, Finance and Legal Studies at the University of Alabama in Tuscaloosa, Alabama. Jing Liu is a graduate student and James Binkley is Professor in the Department of Agricultural Economics at Purdue University in West Lafayette, Indiana.

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tamins makes fruits and vegetables low cost foods. Furthermore, recent work by the USDA (Kuchler and Stewart 2008) found that fruits and vegetables need not, in fact, be particularly costly, which should not be surprising given their wide variety. Other research by the USDA suggests that giving a low income household additional income would not significantly expand its expenditures on fruits and vegetables (Blisard, Stewart, and Jolliffe 2004).

Overall, it would seem that for a consumer concerned with nutrition, income need not be a controlling factor, since many low cost foods are highly nutritious. The USDA "Thrifty Food Plan" is based on foods of this type. But such foods may be inconvenient to prepare and/or relatively lacking in taste. Since most consumers are unwilling to sacrifice all considerations of taste or convenience, budgetary limitations are a potential constraint to a healthier diet. Low income always limits options, so arguably it restricts the ability to eat in a healthy manner. But a clear-cut argument cannot be made, if for no other reason than that the same effect can operate in reverse: higher income can increase choice but in doing so it also increases access to less healthy foods. For example, breakfast sausage may be substituted for oatmeal.

In the final analysis, then, whether income is an important constraint to healthy eating depends on the consumer's objective function, the trade-off between nutrition, convenience, and taste. In their study, Inglis, Ball, and Crawford (2009) find that low income working women are more constrained than high income women, but that the food budget is not the sole reason why low income women have less healthy diets. Recent work has suggested that low income individuals may choose less healthy, tastier foods because they have lower demands for health. As pointed out below, such arguments can be traced back to Grossman (1972). Binkley (2010) developed a model for the demand for longevity, which he used to explain why low income individuals are more likely to smoke.

A recent paper by Binkley and Golub (2010) is of special interest for the study reported herein. They attempted to isolate the nutrition-taste tradeoff while essentially controlling for cost. They examined food categories with varieties that significantly differ in nutritional and taste characteristics but with either no differences in cost or only modest differences, typically with the healthier alternative being cheaper. As they argue, if low income consumers make unhealthy choices within such categories, it cannot be due to affordability. Four food groups were considered: milk, soft drinks, breakfast cereal, and bread. Using 2006 household purchase data, they found income to be positively and significantly related to healthy choices for all four food types.

This study is similar to the Binkley and Golub (2010) study except that we confine our attention to milk and soft drinks and we use actual consumption data for several years. This allows us to assess effects on caloric intake. We limit the study to milk and soft drinks primarily because in each case healthier (or less unhealthy) varieties are easily determined, requiring minimal nutrition knowledge. In each case what matters is the extent of a single nutrient. In the case of milk it is fat content; for soft drinks it is the amount of caloric sweeteners. These beverages are also important both in terms of consumer spending and in the sense that the large majority of households purchase one or more types of each. Americans consumed approximately 20.5 gallons of milk per person and 49 gallons of soft drink per person in 2005 (Gould 2009). According to a USDA report, on average about 10 percent of the nutrition label standard of 2,000 calories is derived from the consumption of non-alcoholic beverages (Capps et al. 2005). Furthermore, there is evidence that rising beverage consumption has been an important factor in the increasing prevalence of obesity in the United States (Bray, Nielsen, and Popkin 2004).

The recommended type of milk for adults and children over the age of two is low-fat or fat-free (skim) (Gidding et al. 2005). Similarly, most people concerned with nutrition would recommend that if soft drinks are consumed those sweetened with non-caloric sweeteners should be chosen. For milk, the recommendations are to some extent being heeded, for consumption of full-fat milk has declined while low-fat types have increased. However, consumption of soft drinks of all types has increased, with sugar-sweetened types increasing more in an absolute sense. In the period from 1970 to 1997, sugar-sweetened soft drink consumption per capita rose by more than 19 gallons, while diet soft drinks increased by more than nine gallons (Putnam and Allshouse 1999). Currently, diet soft drinks account for somewhat less than one-third of soft drink consumption (Popkin 2010).

For present purposes it is very important that in neither case is price a barrier to choosing what is considered healthy food types. In the case of milk, stores usually follow one of two pricing schemes: either they price all varieties the same, or they charge prices varying directly with fat content (California Department of Food and Agriculture, 2008). Since the fat removed from whole milk is a valuable product which can be sold on its own to make items such as butter, wholesale prices for whole and two percent milk are higher than prices for lower-fat varieties. In the case of soft drinks, all varieties of a given brand are virtually always sold for the same price. Therefore price plays no role in the choice between sugar-sweetened and diet.

In short, the two categories are ideal for our purpose because (i) a large majority of people consume these beverages and there are well-defined differences between more and less healthy versions, (ii) the nutrition-taste trade-off is determined by the amount of a single ingredient—calorie sweetener for soft drinks and fat content for milk, and, most importantly, (iii) price cannot be a barrier to choosing the healthier option. We know of no other important food category with these properties.

Methods

Model

Let X_A and X_B be varieties of a good X. Consumer demand for these goods would be obtained by solving the following maximization problem:

$$\max\ U(X_A, X_B, Z; C)$$
$$-\lambda(M - P_{X_A}X_A - P_{X_B}X_B - P_Z Z).$$

Here Z is an aggregate of all other goods, M is income, and C represents a set of consumer characteristics related to preferences. The solution to this problem leads to the demand for (say) X_A as a function of P_{X_A}, the other two prices, income, and consumer characteristics.

If the allocation of income to X and Z is given, the problem becomes the simpler one of determining the share of, say, X_A. For this, P_Z is no longer relevant. The share is a function of M, since the lower income is, the more likely the consumer will choose the lower priced of X_A and X_B, *ceteris paribus*, due to the budget constraint. If P_A equals P_B, this is no longer the case: neither is cheaper, making the budget constraint important only in the initial step of determining the allocation to X. It has nothing to do with the individual shares of X_A and X_B.

In the present case, the prices of A and B can be considered to be the same. Thus the shares depend only on preferences for the characteristics of the individual types. For foods, the important non-price characteristics are convenience, taste, and nutrition. In the present case of milk and soft drinks, convenience is not an issue, since, like price, convenience is the same across types. Thus, type chosen is determined by the weights a consumer places on palatability and nutrition. The first of these is best regarded as unpredictable, perhaps a matter of one's endowment of taste receptors, and hence part of an error term. However, many studies have found that nutrition concerns vary across consumer types, particularly as they relate to age and education, with older consumers and those with more education being more nutrition-conscious. Most important, income can also be a factor only to the extent that it affects nutrition concern. As already suggested, a case can be made that increasing income is likely to be associated with greater demand for nutrition, because of the positive effect of income on the demand for health. In his path-breaking paper, Grossman (1972) used a household production framework to argue that higher earnings make the loss of productive time from poor health more costly for higher income individuals. Thus demand for health rises with income. In a related literature, Becker and Philipson (1998) and Davies and Kuhn (1992) argued that higher future income due to an annuity provides an incentive to adopt healthy habits: the more income, the more utility can be obtained by adding years to one's life. The same idea was employed by Binkley (2010) to explain the smoking behavior of low income individuals.

Sample

The data used in this study are from various years of the National Health and Nutrition Examination Survey (NHANES) and the Continuing Survey of Food Intakes by Individuals (CSFII). The NHANES and CSFII are nationally representative surveys of

people of all ages residing in the United States. They are not panel data because for each period a new sample is drawn. These datasets include socio-demographic information and dietary recall interviews for all participants in the survey. The dietary recall interview records all dietary intakes by type and amount of food and beverages consumed by an individual during the 24-hour period for a total of 1 or 2 days (NHANES 1999–2000 and 2001–2002 are one-day dietary recall, the rest are two-day recall). We analyze five cross-sections of data to assess the consistency of results across years. For each year our samples included all individuals 18 years of age or older who were not on a diet and who consumed milk (soft drinks) during the days covered by the dietary recall interview. Thus for each year we have two samples: those who drink milk and those who drink soft drinks. Anyone who drank both types of drinks was included in both samples. Table 1 reports the total number of adults in our survey who were not on a diet and our final sample sizes for each beverage for each year of data that we use in our analysis. As can be seen, the sample sizes range between 1,972 and 5,000.

Statistical Methods

Multiple regression models were used to determine the relationship between income and energy density by type of beverage. The dependent variables were the energy densities of milk and soft drinks. To construct these variables the dietary recall data were aggregated to find the aggregate energy consumed (in calories) and the aggregate amount of beverage consumed (in grams) over a two-day period for each individual and for each beverage. Energy density was calculated by dividing aggregated energy in calories by aggregated amount in grams for both soft drinks and milk. For example, the regular Pepsi has a density of 0.45 calories per gram, while the diet Pepsi has zero density, no matter how much is consumed.

The NHANES reports household income in categories. The measure of income that we used for this analysis is the midpoint of these income categories. In the case of CSFII, the actual income is used.

The models also included control variables for age, education, race, sex, and household size/presence of children. Generally, we expect older individuals to be more concerned with health and thus more likely to choose a nutritious diet. The same can be said for more educated individuals, since they are more likely to appreciate the importance of health for well-being and diet's role in attaining health. We also expect women to display more concern for nutrition. A reason for this is their traditional role in household food preparation and purchasing (Turrell, 1997).

Arguably, the presence of children in the household increases the chances that higher-fat milk and sugar-sweetened soft drinks will be available in the household and thus adults will consume more energy dense milk or soft drinks.[1] If parents purchase whole milk for their children, they may then consume it themselves, due to the inconvenience of maintaining two varieties simultaneously. This is especially the case since milk in large containers is generally considerably cheaper. The same effect may exist for soft drinks, although it is much less likely, since many households routinely stock multiple varieties of soft drinks.

Table 1 reports the percentage of adults who consumed milk and soft drinks and the average amount consumed. Between 40 to 60 percent of adults reported drinking milk. For those who drank milk, the average amount consumed was between 10.2 to 12.3 ounces of milk per day. Between 50 to 67 percent drank soft drinks at least once during the survey period, and the mean amount consumed was between 22.6 and 26.2 ounces. Between 21 to 37 percent of the sample drank both milk and soft drinks each day.

The samples are described in Table 2. For example, for the sample of milk drinkers, the mean household income fluctuated between $37,700 and $45,600 for all points in time. Household size was consistent across years and ranged from 3.1 to 3.2 persons per household. For all years, more than half the sample had at least a high school diploma. The sample was almost equally divided by gender. The NHANES samples contain disproportionately large percentages of minorities, a result of deliberate oversampling of these groups.

We estimated weighted least squares models using the PROC SURVEYREG procedure in SAS

[1] NHANES does not explicitly account for the number of children in the household. Only household size is available. Thus, for NHANES, we use household size as a proxy of the real number of children in the household.

Table 1. Sample Size by Year

Year	2005–2006	2003–2004	2001–2002	1999–2000	1994–1996
Adults who are not on diets	4,109	4,057	5,501	4,592	7,772
MILK SAMPLE					
Adults who are not on diets and consume milk	2,248	2,340	2,245	1,972	4,749
Percentage who drink milk	54.71	57.68	40.81	42.94	61.10
Average amount of milk consumed per day (oz)	11.35	11.90	12.26	11.32	10.23
SOFT DRINK SAMPLE					
Adults who are not on diets and consume soft drink	2,737	2,730	2,802	2,406	4,938
Percentage who drink soft drink	66.61	67.29	50.94	52.40	63.54
Average amount of soft drink consumed per day (oz)	23.92	26.18	24.77	24.89	22.61
Percentage who drink both	35.46	36.75	21.36	23.43	37.36

9.1. All estimates were weighted using the interview weights that account for the unequal probabilities of selection, person-level non-response, and a post-stratification adjustment to the estimated national population.

Results

The results are reported in Table 3 for milk and Table 4 for soft drinks. These tables report the estimated coefficients and the standard errors. As can be seen, the estimated results were very similar across all the years that we analyzed. The R^2's, while low, are reasonable for data at the individual level.

All the estimated income coefficients are highly significant and suggest a negative relationship between income and energy density. As income increases, the energy density of both soft drinks and milk consumed decreases. For example, in 2005–2006 energy density decreases by 0.003 and 0.01 calories per gram for milk and soft drinks respectively with every $10,000 increase in income. The result is consistent for all the years we studied for both types of beverage. The effect of income on energy density of milk is smallest in the last sample year, but shows no real trend. The relationship between income and soft drinks is also steady and is in all cases somewhat stronger than that for milk. It fluctuates from -0.01 in 2005–2006 to -0.007 in 2003–2004. The difference in magnitude between the parameter values for milk and soft drinks is explained by their relative density difference. The density difference between regular soft drinks and diet is 0.45 calories per gram compared to a difference of 0.03 calories per gram for whole versus skim milk. Thus, replacing caloric soft drinks with diet versions yields a larger per ounce calorie reduction than does replacing whole milk with skim.

Regarding the remaining variables, more education is consistently found to be associated with better nutrition, which in our case translates into choosing lower calorie beverages. Similarly, women tend to be more conscious of nutrition and we find a strong negative relation between energy density and being female. Generally, we find that minority groups are less prone to consume lower calorie beverages than Caucasians. This was also a consistent finding in Binkley and Golub (2010).

Household size has a positive correlation with energy density for milk, which, assuming it to be an adequate proxy for presence of children, is what we expected, as indicated earlier. (And for CSFII it is not a proxy.) There is no significant effect for soft drinks. This lack of an association may be because soft drinks can easily be purchased in multiple sizes and varieties. Unlike milk, they can be stored for indefinite periods of time with or without refrigeration.

Discussion

The primary objective of this investigation was to explore the relationship between income and

Table 2. Socioeconomic and Demographic Characteristics of the Analytic Sample

	Milk					Soft Drink				
Variable	2005–2006	2003–2004	2001–2002	1999–2000	1994–1996	2005–2006	2003–2004	2001–2002	1999–2000	1994–1996
DEPENDENT VARIABLE										
Energy density, calories/gram	0.50	0.50	0.49	0.51	0.50	0.30	0.31	0.32	0.31	0.31
HOUSEHOLD VARIABLES										
Mean household income, $10,000	4.56	3.88	4.38	3.77	3.78	4.56	3.94	4.20	3.74	3.88
Mean household size/kids, persons	3.20	3.09	3.16	3.15	0.69	3.34	3.30	3.49	3.42	0.82
CHARACTERISTICS OF THE INTERVIEWEE										
Age, years	45.74	48.75	48.20	49.22	49.10	41.27	42.21	41.47	41.95	43.05
Gender, % male	47.20	48.97	46.90	45.44	52.24	51.81	51.50	51.36	47.84	54.13
Race/ethnicity										
Non-Hispanic White, %	52.62	55.00	58.89	49.70	84.02	44.98	48.28	49.04	42.93	80.36
Mexican, %	23.58	23.89	22.58	29.97	2.57	24.48	23.37	23.59	29.55	3.10
Other Hispanic, %	3.02	3.08	3.79	5.83	1.52	3.03	3.04	3.96	6.32	1.70
Non-Hispanic Black, %	16.99	14.91	11.94	11.97	8.55	23.97	22.09	20.38	17.54	11.46
Others, %	3.78	3.12	2.81	2.54	3.35	3.54	3.22	3.03	3.66	3.38
Education level										
Less than high school, %	29.54	33.72	30.38	37.93	20.99	31.02	32.34	32.44	37.45	18.69
High school, %	25.89	24.36	23.96	23.07	34.34	26.93	26.23	26.59	24.81	36.53
Some college, %	26.60	25.17	25.17	21.10	20.34	26.78	27.11	25.16	23.61	22.09
College and above, %	17.97	16.75	20.49	17.90	24.32	15.27	14.32	15.81	14.13	22.68
Sample size	2,248	2,340	2,245	1,972	4,749	2,737	2,730	2,802	2,406	4,938

Note: “Mean household kids” for 1994–1996 refers to the average number of children under age 18 in the household.

Table 3. Result of Regression Models for Milk Density

Variable	2005–2006 Regression Coefficient	2003–2004 Regression Coefficient	2001–2002 Regression Coefficient	1999–2000 Regression Coefficient	1994–1996 Regression Coefficient
Intercept	0.483***	0.534***	0.537***	0.540***	0.559***
	(0.014)	(0.012)	(0.019)	(0.017)	(0.009)
HOUSEHOLD VARIABLES					
Household income, $10,000	-0.003***	-0.005***	-0.004***	-0.005**	-0.005***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Household size/kids, persons	0.010***	0.006***	0.004	0.006**	0.007***
	(0.002)	(0.001)	(0.003)	(0.003)	(0.002)
CHARACTERISTICS OF THE INTERVIEWEE					
Age (18 and above), years	-0.00001	-0.0003**	-0.0004**	-0.0004**	-0.0004**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Gender (reference = male)	-0.009**	-0.019***	-0.021***	-0.016***	-0.018***
	(0.003)	(0.004)	(0.005)	(0.005)	(0.003)
Race (reference = non-hispanic white)					
Mexican	0.026***	0.023***	0.035***	0.032***	0.045***
	(0.008)	(0.007)	(0.007)	(0.006)	(0.010)
Other Hispanic	0.019	0.031*	0.047***	0.042***	0.038***
	(0.022)	(0.015)	(0.014)	(0.009)	(0.010)
Non-Hispanic Black	0.051***	0.047***	0.054***	0.041***	0.057***
	(0.006)	(0.005)	(0.005)	(0.008)	(0.009)
Others	0.043***	0.034***	0.022	0.009	0.045***
	(0.012)	(0.011)	(0.016)	(0.015)	(0.009)
Education (reference = less than high school)					
High school	-0.015**	-0.012	-0.019**	-0.015**	-0.018***
	(0.006)	(0.010)	(0.007)	(0.005)	(0.004)
Some college	-0.017*	-0.024***	-0.036***	-0.042***	-0.039***
	(0.009)	(0.006)	(0.007)	(0.008)	(0.006)
College and above	-0.041***	-0.053***	-0.056***	-0.066***	-0.059***
	(0.010)	(0.011)	(0.010)	(0.010)	(0.006)
Sample size	2,248	2,340	2,245	1,972	4,749
R square	0.158	0.188	0.171	0.201	0.165

Notes: Results are based on weighted multiple regression models run on analytic sample of one/two-day dietary interviewees from NHANES/CSFII Dietary Interview, Individual Foods. The dependent variable is the intake density of milk reported in calories per gram. Numbers in parentheses are standard errors. * denotes significance at the 0.1 level, ** denotes significance at the 0.05 level, and *** denotes significance at the 0.01 level.

Table 4. Result of Regression Models for Soft Drink Density

Variable	2005–2006 Regression Coefficient	2003–2004 Regression Coefficient	2001–2002 Regression Coefficient	1999–2000 Regression Coefficient	1994–1996 Regression Coefficient
Intercept	0.422**	0.429***	0.464***	0.462***	0.469***
	(0.019)	(0.020)	(0.019)	(0.017)	(0.013)
HOUSEHOLD VARIABLES					
Household income, $10,000	-0.010***	-0.007***	-0.009***	-0.008***	-0.009***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)
Household size/kids, persons	0.002	0.004	0.005	0.005	0.0001
	(0.002)	(0.003)	(0.003)	(0.004)	(0.003)
CHARACTERISTICS OF THE INTERVIEWEE					
Age (18 and above), years	-0.002***	-0.002***	-0.003***	-0.003***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Gender (reference = male)	-0.056***	-0.041***	-0.043***	-0.046***	-0.049***
	(0.009)	(0.006)	(0.008)	(0.008)	(0.004)
Race (reference = non-hispanic white)					
Mexican	0.029***	0.019**	0.021**	0.008	0.039***
	(0.007)	(0.008)	(0.009)	(0.009)	(0.010)
Other Hispanic	0.033*	0.003	0.019	0.023	0.046***
	(0.016)	(0.015)	(0.027)	(0.016)	(0.015)
Non-Hispanic Black	0.075***	0.053***	0.053***	0.055***	0.058***
	(0.009)	(0.007)	(0.010)	(0.010)	(0.007)
Others	0.061***	0.011	0.061**	0.026*	0.034**
	(0.019)	(0.012)	(0.022)	(0.014)	(0.015)
Education (reference = less than high school)					
High school	-0.001	-0.018	-0.011	-0.001	-0.002
	(0.007)	(0.013)	(0.006)	(0.009)	(0.007)
Some college	-0.026***	-0.030***	-0.015	-0.015	-0.022**
	(0.007)	(0.010)	(0.011)	(0.009)	(0.010)
College and above	-0.057***	-0.069***	-0.047***	-0.058***	-0.058***
	(0.010)	(0.013)	(0.014)	(0.019)	(0.007)
Sample size	2,737	2,730	2,802	2,406	4,938
R square	0.187	0.154	0.158	0.166	0.148

Notes: Results are based on weighted multiple regression models run on analytic sample of one/two-day dietary interviewees from NHANES/CSFII Dietary Interview, Individual Foods. The dependent variable is the intake density of soft drink reported in calories per gram. Numbers in parentheses are standard errors. * denotes significance at the 0.1 level, ** denotes significance at the 0.05 level, and *** denotes significance at the 0.01 level.

healthy food choices. We chose two food groups where price does not constrain the consumer from choosing the healthier option. As explained earlier, soft drinks are the same price regardless of variety and low-fat milk is in general cheaper than full-fat milk. Thus, in both cases healthier (lower calorie) options are at least as low in price as those with lower nutrition. Despite this, we found that low income consumers on average choose higher calorie types of both beverages.

To put the results in context, the results for 2005–2006 suggest that for every $10,000 increase in income, the corresponding energy density of milk is 0.003 calories per gram lower. Thus, consider two individuals with the same milk consumption and otherwise identical except one has $10,000 more in household income. The higher income individual is estimated to consume 377 fewer calories per year from drinking milk. This is more than the number of calories in 2.5 cups of whole milk, which has 147 calories per cup. A corresponding calculation for soft drinks implies that over the course of a year the same individual will consume 2,555 fewer calories from drinking soft drinks. This is about 18 cans (assuming a 12-ounce can of soda is 140 calories) of sugar-sweetened soft drinks per year. In terms of weight loss it would lead to a weight reduction of about two-thirds of a pound per year.

Taken together, these results suggest that, at least for two of the most popular beverages in the U.S. diet, low income people may be less willing to trade off taste for nutrition, even when there is no additional cost involved. While the calorie reductions are not staggeringly large, if similar differences exist in other aspects of the diet they could certainly lead to perceptible differences in obesity across income groups. Thus, our research suggests that cost may not be the only factor in the poor dietary choices of low income individuals. The consistency of the income results across years lends confidence to this conclusion, as well as the fact that the results echo those of Binkley and Golub (2010) using a different type of data. Clearly, costs may not be the sole or even the most important reason why low income people choose not to eat nutritiously.

If we are to change eating patterns, then alternative investigations need to be conducted to determine why low income people indulge in unhealthy eating behavior. In particular, we need to look at investment in health and healthy behavior over the entire lifecycle. Investment in health today results in better health tomorrow. Low income people arguably may be less willing to undergo this cost today (of giving up tasty eating) if the health gain in the future is less valuable to them.

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