Energy-adjusted food costs make little economic sense

Dear Sir:

The reason for this letter is to try to explain why, as economists, we question the relevance of using energy-adjusted costs—as used in 2 articles published in a recent issue of the Journal (1, 2)—to address policy questions such as whether healthy foods or diets cost more.

Whereas adjustment for calories may be appropriate for nutrients and other biological measures, adjusting food costs for calories results in a measure that has questionable practical relevance to consumers and may actually lead to erroneous conclusions.

The nutrition literature typically adjusts food costs for calories in 1 of 2 ways: 1) by estimating the price-per-calorie of different foods by dividing the price of a food by its caloric content (eg, dividing the price per pound for apples by the calories in a pound of apples) or 2) by adjusting total daily food costs for caloric intake (energy-adjusted costs), in which the amount of money an individual spends on food is divided by the number of calories consumed. We interpret the “residual-adjusted daily dietary cost” used in the Bernstein et al (1) article as a type of energy-adjusted cost, in which the cost per caloric is then multiplied by a constant number of calories, to represent “the amount of money spent on food by each participant if she were consuming a 1800 calorie diet” (1).

Dividing the price or food cost by calories is a mathematical manipulation of questionable practical use. There is no evidence that consumers have or use any type of a “cost-per-calorie” budget. For example, a consumer can buy a gallon of skim milk for the same amount of money (or even a few pennies less) than a gallon of whole milk. However, a gallon of skim milk provides half the calories (1333 kcal) as a gallon of whole milk (2381 kcal) (3).

As a result, the price per calorie for skim milk is twice the price per calorie of whole milk. We question whether it is appropriate to conclude that skim milk costs more and is less affordable than whole milk or whether the “price differential” helps to explain why less-healthy food choices are associated with lower levels of education and income.

Because energy-adjusted prices measure a theoretical construct that is not closely related to actual food prices or food budgets, we fail to see the relevance or usefulness of using measures of price-per-calorie or energy-adjusted food costs to address important policy questions related to whether healthy foods cost more than energy-dense, nutrient-poor foods.

Furthermore, adjusting food costs for calories ignores the reality that if individuals spend more money because they eat more calories, this additional cost needs to be measured and considered in the analysis. For example, Townsend et al (4) concluded that healthier diets had higher energy-adjusted costs than did less-healthy diets. They also reported that healthier diets were lower in calories than the less-healthy diets. Yet, when Frazao (5) multiplied the energy-adjusted costs by the total number of calories consumed, she found that consumers actually spent more money in total for the less-healthy diets than for the healthier diets—the reverse of what Townsend et al (4) had concluded.

Because we fail to see the policy relevance of adjusting food prices and costs by calories, we would like to encourage nutrition researchers to move away from using energy-adjusted food prices and costs and to consider using more realistic measures of food prices and food costs.

In addition, because the findings and conclusions based on energy-adjusted measures can differ dramatically from the findings and conclusions based on measures of food prices and costs that are not adjusted for calories, it is imperative that nutrition researchers clearly and completely qualify their statements about food prices and food costs as being energy-adjusted. Both of the articles cited above fail to do so, leading casual readers to believe that the findings and conclusions relate to actual food prices and food costs and, in some cases, to the wrong conclusions. We also urge reviewers and journal editors to hold authors accountable in accurately specifying all references to energy-adjusted costs and energy-adjusted spending.

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Elizabeth Frazao
Andrea Carlson
Hayden Stewart

Economic Research Service
1800 M Street, NW
Washington, DC 20036-5831
E-mail: efrazao@ers.usda.gov

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