

likely to have the desired quality, and manufacturers would most likely adopt sufficient quality controls to satisfy consumer preferences. The market response is weak now because only some consumers know that product quality problems exist, and even these consumers must rely on imperfect information. If there were uniform quality control practices throughout the industry that ensured against product quality defects, consumers would not have to search for the products that they believe are free from contamination or have the identity, purity, strength, quality, and composition they want. Consumers could more reasonably assume that all products are free from contamination and have the identity, purity, strength, quality, and composition stated on the label.

We faced the problem of trying to measure what people would pay for more uniform products quality if they knew that manufacturing quality requirements did not already exist. To estimate what people would pay, we start with the hypothetical behavior of people aware of the lack of uniform product quality; we call these hypothetical people the "sophisticated consumers."

Sophisticated consumers spend time searching for signals about the quality of dietary supplements. The proposed CGMP regulations would reduce the amount of search (by some uncertain amount) carried out by these consumers. The benefits of the rule, however, would not be confined to sophisticated consumers. We also expect "naive consumers" to enjoy the benefits. Naive consumers would incur the costs of additional search once the correct or adverse information about quality is available, suffer from worry or an illness from taking poor quality products, or incur the cost of paying for products that do not meet their needs (Ref. E28). Once good practices are in place they would avoid these costs. Naive consumers are those who fail to search for quality or search little not because they do not care but because they do not know that quality varies as much as it does. In other words, they lack the information that problems exist; if they know about the problems, they would search or be willing to pay more to ensure that supplements they consume meet minimum quality standards. Although these naive consumers may not change their behavior in response to the proposed CGMP regulation, they would nonetheless enjoy the benefits. The naive consumers, of course, also represent real consumers of dietary supplements. The total benefits of the quality standards part of the proposed

rule will be the implicit value of the gain in product quality enjoyed by all consumers.

The problem is to measure that gain based on hypothetical searches. We needed to use data from searches in other markets, because we found no information on direct or indirect searching for minimum dietary supplement quality standards. For the sophisticated consumer, we assumed that the value of search time should be approximately the same as the willingness to pay for an attribute of the good. Sophisticated consumers will hypothetically search until the expected benefit of continued searching is less than the expected cost of continued searching. The total cost of search time will, on average, be no more than the expected cost of the additional quality desired. Search time includes the time spent: Reading product labels and other literature about the product, comparing one product with other products, examining the product itself (sometimes carefully), thinking about the product, and second guessing final decisions. It might also include the time actually shopping for the product: Finding the locations where the product is sold, driving there and back, waiting in checkout lines, and walking up and down the aisles.

We used information on shopping times for a range of products to derive an estimate for the hypothetical search time for dietary supplements. We assumed that some fraction of shopping time is pure search time, although we also recognize that search time includes more than the search for product quality. Some search time, for example, is for price, efficacy, and other attributes. The reduction in search time for the sophisticated consumer would therefore be at most a fraction of total search time for dietary supplements. The measure of time saved then is:

Reduced search time due to CGMP regulation = shopping time × fraction of shopping time spent searching × fraction of search time associated with searches for quality × fraction of search time associated with searches for quality that would be eliminated if CGMP rule guaranteed minimum quality.

We took the estimated reduction in hypothetical search time for the sophisticated consumer and applied it to all consumers to get an estimate of the implicit benefits of establishing minimum quality standards. This estimated saving in hypothetical search time is not a forecast of reduced shopping time; it is a proxy measure of the benefit from reduced variance and

improved mean product quality. We anticipate little or no change in aggregate shopping time for dietary supplements.

We converted the time measure into a monetary measure by multiplying the time reduction for sophisticated consumers by the average wage rate. The benefits measure reduced search time associated with improved quality assurance:

Quality assurance benefits = reduction in search time (in hours per year) per sophisticated consumer × average wage rate per hour × total number of consumers.

The shopping time model is an indirect approach to measuring benefits in a market with asymmetric information; it is not a prediction about how shopping behavior will change in that market. Indeed, we believe that most of the beneficiaries of this part of the rule will never recognize that they are beneficiaries.

Standardization imposes minimum requirements on manufacturing, which in turn should reduce the variance of product quality. The reduction in product quality variation should reduce the amount of information sophisticated consumers need to acquire before purchasing dietary supplements (Ref. E29). People need not rely as much on such indicators as brand names, price, place of purchase, articles in consumer magazines, or advertising to determine the likelihood that dietary supplements meet minimum quality standards.

Although no studies deal with dietary supplements directly, the literature on consumer search for other commodities provides insights that increase our understanding of the search costs for supplements (Refs. E30 and E31). Duncan and Olshavsky (Ref. E32) surveyed buyers of television sets and found that 88 percent of respondents performed some type of search activity before purchase. In a study (Ref. E33) of consumer search for microwave ovens, the average buyer of a new microwave oven was willing to search for four alternative products. Search for groceries has been characterized as a two-stage process (Ref. E34). First, people engage in prestore activities, such as reading advertisements, writing shopping lists, clipping coupons, and comparing stores. Second, people engage in search activities at the store, including price and product comparison and search for items with coupons. Most people devote time to search activities for all but the most routine purchases.

To estimate the reduction in hypothetical search costs from the proposed rule, we started with estimates