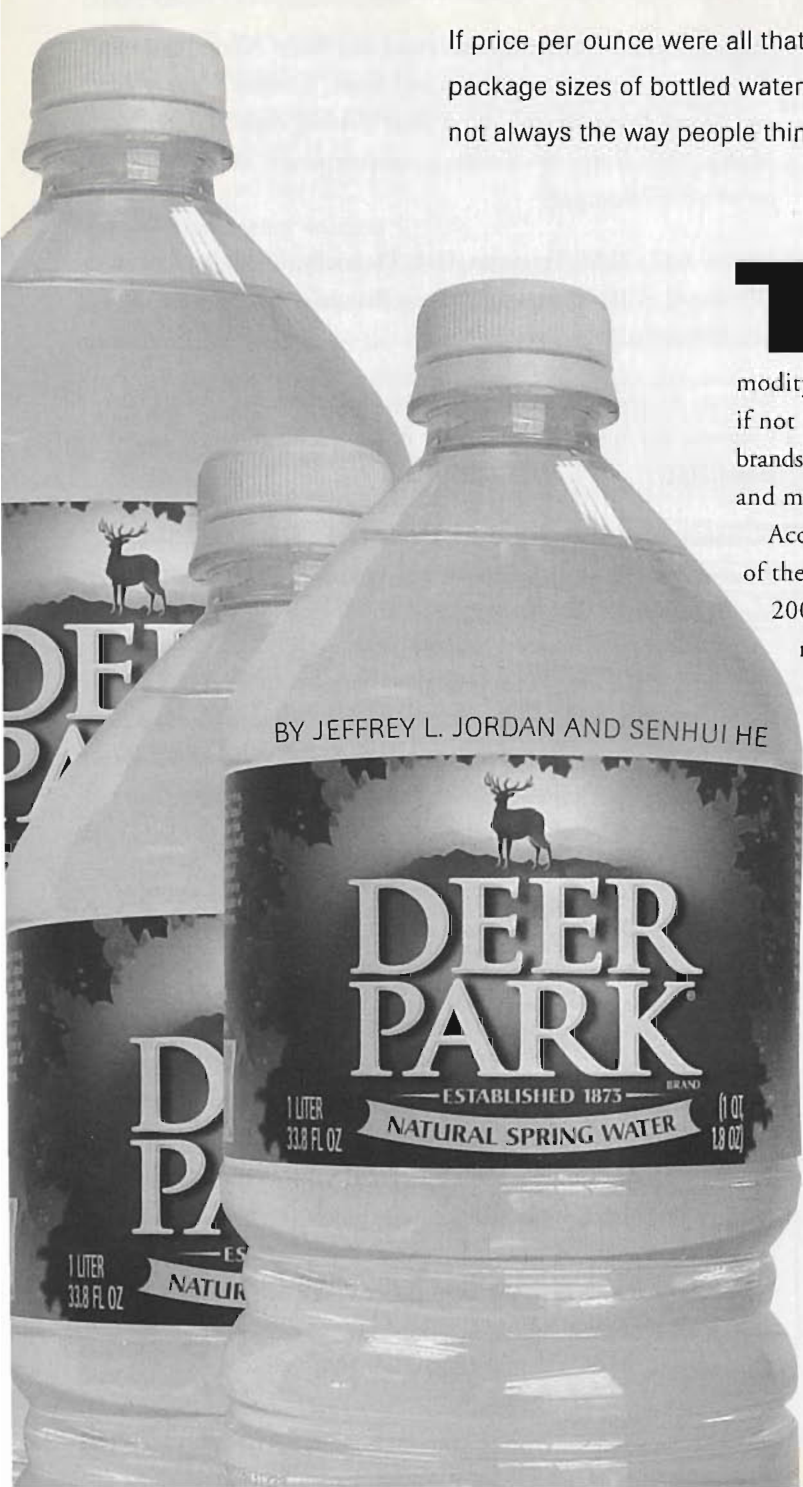
Size Counts: The Economic Value of Bottled Water

If price per ounce were all that mattered, consumers would purchase only the largest package sizes of bottled water. However, they do not, suggesting that size matters...just not always the way people think it does.



BY JEFFREY L. JORDAN AND SENHUI HE

TAKE a commodity that anyone can get for less than a penny per gallon, put it in a bottle, and sell it in every grocery store, convenience outlet, and vending machine in America. The commodity is water and the idea has become a big revenue generator. Many, if not most, grocery stores use nearly an entire aisle to display dozens of brands of bottled water: big, small, flavored, fizzy, mineral, spring, caffeinated, and more.

According to the International Bottled Water Association, 38 percent of the water an average American drinks is bottled water. From 1990 to 2000, sales in the U.S. bottled water market increased from 2,238 million gallons to 5,033 million gallons, and sales in 2000 reached $5,696 million. Industry projections for 2004 say consumption will increase to 6,784 million gallons — about 24 gallons per capita. Even soft drink giants Coke and Pepsi now compete heatedly for the bottled water market.

Why do so many people buy bottled water? Public concerns about tap-water quality are at least partly responsible for the decade-long explosion in bottled water consumption. Research has been conducted to learn how bottled water is used to help avoid health risk associated with drinking tap water. The researchers use total expenditure on bottled water as a proxy for the cost of averting health-risks (Giraldez and Fox; Chowdhury and Lacewell; Larson and Gnedenko; Abrahams, Hubbell, and Jordan).

A look at bottled water containers, however, may lead to questions regarding the use of bottled water for health risk reduction. If people use bottled water to help avoid health risks at home, they would use large bottles because water in large bottles is less expensive and more convenient than water in small bottles.

Yet consumers continue to pay the higher prices and use water in small bottles. Consumers likely purchase water in small bottles for other purposes, such as convenience in use and in storage. If consumers purchase water in small bottles for benefits other than those related to health, then the use of total expenditure on bottled water as an estimate of consumers' willingness to pay to avoid health-risks leads to an overstatement of consumer willingness to pay for safer drinking water. The overstatement is due to the neglect of the expenditure effect related to the size of the bottle — its ease of handling and storage. This expenditure effect is the increase in the total amount spent on bottled water as a result of the differences in bottle size. However, when policymakers examine safe drinking water regulations, they seem to assume that the increased purchases of bottled water indicate a willingness to pay more and more for safe drinking water.

If people are buying bottled water only as a healthier substitute for tap water, policymakers could assume that people would pay similar amounts for regulations designed to increase the quality of domestic tap water. However, if consumers are buying convenience rather than increased quality, policymakers could overestimate how much consumers would pay for changes in drinking water regulations. Thus, policymakers must be made aware of the importance of the expenditure effect related to bottle size.

We gathered data on bottle sizes, water types, retail prices, brands, and production sources from ten supermarkets in the Atlanta area. The bottle sizes, ranging from 6.5 ounces to 2.5 gallons, were grouped into four size categories: small size, middle size, multi-bottle pack, and large bottle (Figure 1). The small size category included single bottles containing 16 to 20 ounces (mean = 19 oz.), middle size were single bottles containing 1.0 to 1.5 liters (mean = 44 oz.), multi-bottle packages contained bottles of 6.5 to 20 ounces (mean = 16 oz.), and large size included single bottles containing 2 liters, 6 liters, 1 gallon, or 2.5 gallons (mean = 179 oz.). The small size and multi-pack categories combined included individual bottle sizes of less than 20 ounces and accounted for 27 percent of the bottles on the store shelves.

We collected data for six water types: spring, artesian, distilled, drinking, mineral, and purified water (Figure 2).

About 10 percent of the products came from unknown producers. The rest came from seventeen producers, both domestic and foreign. About 62 percent of the total number of bottles on the shelves in the sampled stores were products from Georgia, Florida, Canada, or California (Figure 3).

We converted recorded prices into cents per ounce of water. The lowest price was 0.45 cents per ounce for drinking water in large bottles (mean price among large bottles was 0.85 cents per ounce) and the highest price was 8.48 cents per ounce for drinking water in the multi-bottle pack category (mean price 3.68 cents per ounce). Figure 4 shows the mean price in cents per ounce of bottled water in each of the four size categories.

The data covered sixty brands, including internationally known as well as local brands. Crystal Springs got more grocery shelf space than any other single brand (Figure 5). The Crystal Springs water sold in Georgia was bottled in Georgia by a division of the Suntory Water Group.

We estimated how much people were willing to pay for bottled water (price per ounce) by using data based on brand, store, source of the water, water type (artesian, distilled, drinking, mineral), and size of bottle. Our goal was to find the effects of these product characteristics — especially size of bottle — on price. The results show that most product characteristics are significant and consistent with our expectations: small size, middle size, and multi-bottle packaging were all found to have a positive effect on the price.

Figure 1 Store Distribution of Four Size Categories
(bottles on shelves)

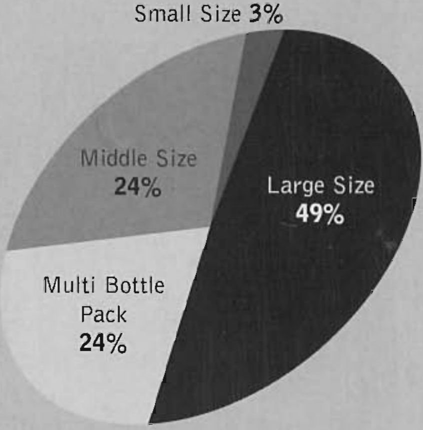


Figure 2 Store Distribution of the Various Types of Water
(bottles on shelves)

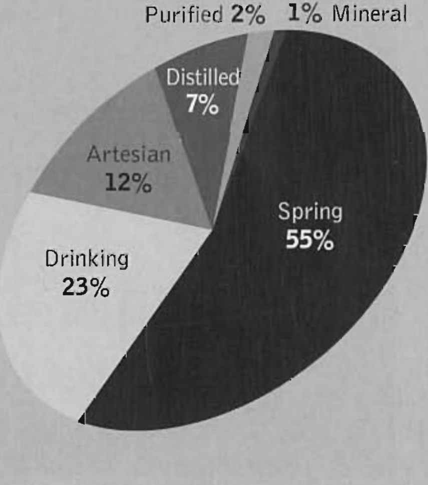


Figure 3 Store Distribution of Various Production Sources
(bottles on shelves)

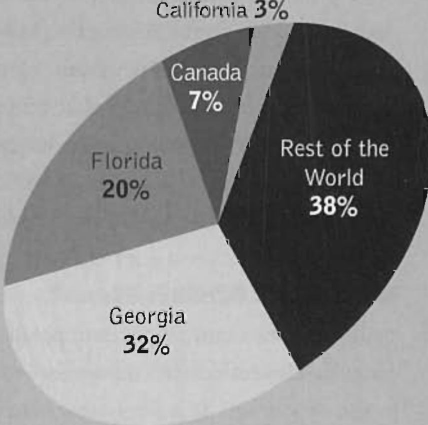


Figure 4 Mean Price in Cents per Ounce of Bottled Water of the Four Size Categories

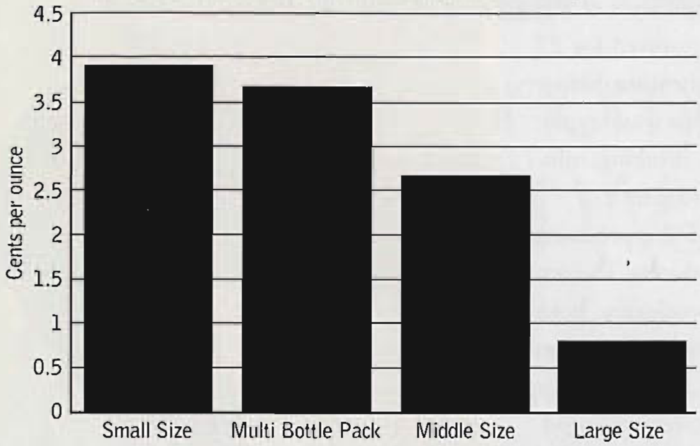
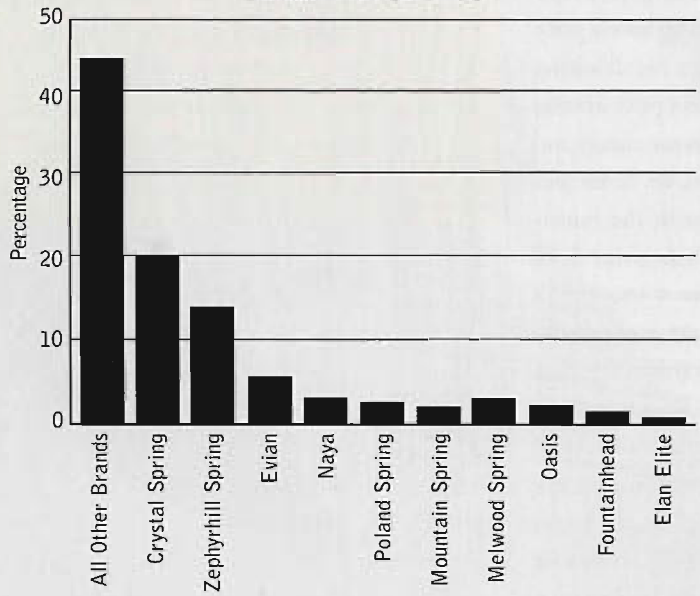


Figure 5 Store Distribution of Various Brands (bottles on shelves)



The price effects of the size categories provide essential information for determining the economic value of bottle size. The price premiums (2.36 cents for small size, 2.04 cents for middle size, 2.12 cents for multi-bottle packs) represent the increase in per ounce price that comes from selecting a smaller rather than a larger bottle size. We found that 55 cents of each dollar spent on bottled water was spent in order to purchase the small size bottle. In other words, on average, over half the value of bottled water is accounted for by the size of the bottle.

What Does All This Mean?

Bottle size is an important product characteristic of bottled water. It may reflect the importance of such factors as convenience in use or storage. It is likely that when people buy bottled water, they are purchasing this convenience rather than attempting to avert unsafe tap water. Ignoring the expenditure effect of bottle size allows overstatement of consumer willingness to pay for safer drinking water by more than 100 percent.

So, are consumers flocking to the bottled water shelves in grocery stores to avoid "unsafe" drinking water from a public water utility? Probably not. Is their willingness to pay higher prices for bottled water a signal to policymakers that consumers would be equally willing to pay higher water bills at home to avoid "unsafe" water? Again, probably not. Should policymakers use bottled water prices as an indication of consumers' dissatisfaction with tap water? The economics of bottled water purchases says "no." Do consumers want safe water? Of course they do — but for now, paying for bottled water seems to be more about convenience than about health.

For more information:

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