



An Economic Analysis of Domestic Market Impacts of the U.S. Highbush Blueberry Council

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The U.S. Highbush Blueberry Council (USHBC) is a federal checkoff promotion program that began promotion activities in October 2001. The program uses a variety of promotion techniques in an attempt to increase the demand (sales) for blueberries. In the domestic market, these activities range from technical assistance and promotion to food service, public relations, and a small amount of magazine advertising. In international markets, the Council receives some funding from the USDA Market Access Program.

The USHBC is authorized under the Commodity Promotion, Research, and Information Act of 1996 and was approved in the spring of 2000 by a majority (67.8 percent) of producers and importers in a special referendum. Under the program, domestic blueberry producers and importers are assessed at a rate of \$12.00 per ton, and the collected revenue are used to fund promotion, research, and information projects. The total budget for the program has recently been about \$1.4 million annually, with the bulk of money going domestic promotions (in 2004, \$704,000 was spent on domestic blueberry promotion).

Under the 1996 and 2002 Farm Bills, all federal checkoff promotion programs must be evaluated so that their return to

investors can be determined. Accordingly, the purpose of this research is twofold: (1) to determine the domestic market impacts of the USHBC's promotion programs, and (2) to compute a benefit-cost ratio (rate-of-return) for the promotion activities conducted by the USHBC. In this study, the impacts of the export marketing activities conducted by the USHBC are not evaluated, since the bulk of the Council's marketing budget is invested in the United States. Specifically, this research examines whether the domestic blueberry promotion activities of the USHBC have had a positive and statistically significant impact on domestic shipments of blueberries and on grower profits. The impacts of all factors affecting domestic blueberry demand for which data are available are measured statistically. In this way, we can net out the impacts of other important factors affecting blueberry demand over time. In addition, the value of the extra sales generated by the USHBC's marketing activities is estimated. These benefits to blueberry growers and processors are compared with the costs associated with the USHBC.

Trends in U.S. Blueberry Consumption

Domestic consumption of blueberries in the United States has generally been increasing since the

late 1970s. Figure 1 displays domestic per capita consumption of blueberries from 1976 through 2004. Per capita consumption bottomed out at about 5.1 ounces per person in 1978. However, since then, per capita consumption has been trending up. In 2004, per capita consumption reached its highest level at 19.1 ounces. What has fueled this tremendous increase in per capita consumption since 1978?

One factor that has likely caused growth in consumption of blueberries over this period is that the real (inflation-adjusted) price of blueberries has declined. While we did not have access to retail price data for blueberries in this study, it is clear that the real price at the grower level has declined since 1976. Figure 2 shows the grower price for blueberries in New Jersey deflated (i.e., expressed in 2004 dollars) by the Consumer Price Index for all items (2004 = 1.0) from 1976 through 2004. While there are some significant fluctuations in the real grower price for blueberries over this period, the trend has been downward. In 1976, for example, the price of blueberries at the grower level was \$1.29 per pound (in 2004 dollars); by 2004, this price was \$0.95 per pound, which is 26.4 percent lower in real terms. Consequently, compared with all items in our economy, blueberries have become relatively less expensive,

which should have a positive impact on blueberry consumption.

Another factor that may have positively influenced consumption of blueberries is strong growth in U.S. disposable income over this period. Real (inflation-adjusted income) disposable income from 1976 through 2004 is shown in Figure 3. In 1976, per capita income was \$19,796 per person, and by 2004 had climbed to nearly \$29,400 per person. Growth in real income generally has a positive impact on the demand for most foods.

Another factor that has undoubtedly increased per capita blueberry consumption over this period is the growing concern about the links between dietary health and serious diseases such as heart maladies and cancer. Increasingly, the American public is being told by the medical profession and relevant government agencies that increased consumption of fruit and vegetables is necessary for good health. Blueberries are considered to be part of a healthy and nutritious diet. This trend in dietary concerns has been increasing, particularly since the mid-1980s. While this factor is difficult to quantify, a proxy is included in the empirical model used in this study.

Finally, another factor that has likely contributed to growth in per capita consumption of blueberries is the promotion efforts of the USHBC. Figure 4 displays real inflation-adjusted expenditures on generic blueberry promotion since 1976.¹ Since 1976, promotion expenditures have increased

significantly. For instance, in 1976 the industry voluntarily contributed \$142,400 (measured in 2004 dollars) for generic blueberry promotion. By the 1990s, this figure grew to as high as \$440,000, or nearly 3.5 times larger. Finally, with the implementation of the national blueberry checkoff program, generic promotion of blueberries in domestic markets rose to \$704,000 in 2004.

The growth in per capita consumption since 1976 is crucial to the overall health and viability of the U.S. blueberry industry. The increase in per capita consumption that has occurred since 1976 has been accompanied by a positive (albeit sporadic) trend in grower revenue. In 1978, total grower revenue was \$144 million. In 2004, total revenue grew to \$264 million, an increase of 83 percent. Clearly, it behooves the industry to market blueberries effectively, since growth in consumption is so beneficial to grower revenues. But while this graphical analysis is useful in depicting various trends in factors affecting blueberry consumption over time, it does not tell us anything about how important these factors actually are in influencing consumption. For this, we need to turn to an econometric model of blueberry demand.

Econometric Model and Results

The econometric blueberry demand model developed in this study used annual time series data for the period 1976-2004. In order to distinguish the impact of the USHBC's generic promotion

activities on demand for blueberries from the impacts of other factors influencing demand, an econometric framework was adopted. The econometric approach quantifies economic relationships using economic theory and statistical procedures with data. It enables one to simultaneously account for the impact of a variety of factors affecting blueberry demand. These demand-determining factors (called "determinants") included the price of blueberries, prices of blueberry substitutes, population, consumer tastes and preferences, and the USHBC's generic promotion expenditures.

While we focus on the promotion results here, the results for the other demand factors, e.g., price, income, etc. are available from the author upon request. The results indicated that generic blueberry promotion has had a positive and statistically significant impact on per capita blueberry demand. This means that statistical evidence supports the hypothesis that the USHBC's promotion activities increase demand for blueberries in the United States. The estimated generic promotion elasticity was 0.043, which means that a 1 percent increase in generic blueberry promotion expenditures would result in a 0.043 percent increase in per capita domestic blueberry demand. While this elasticity is not large relative to those for other demand determinants, it is statistically different from zero and positive. Moreover, two points should be considered. First, one should not expect a large promotion elasticity, since the annual budgets of the USHBC are quite small. Second,

(Footnote)

¹ Prior to the creation of the USHBC in 2001, the North American Blueberry Council, a voluntary checkoff program for blueberries, conducted generic promotion activities in the United States.

and related, since the costs of the USHBC are relatively small, it does not take a large promotion elasticity to lead to positive net benefits of the program.

The estimated demand equation was simulated to determine the market impacts of the USHBC promotion activities for the period 2001-2004. In the baseline scenario, promotion expenditures were set equal to actual levels from 2001 to 2004. In the no-USHBC scenario, promotion expenditures were set equal to zero from 2001 to 2004. The difference between the two scenarios gives the total impact of USHBC promotion programs on domestic blueberry commercial disappearance. The simulation results indicate that the USHBC had a major impact on annual blueberry demand in the United States. From 2001 to 2004, the USHBC's promotion activities increased total blueberry commercial disappearance by 36 million pounds in total, or 9 million pounds per year. This represents an annual increase in blueberry commercial disappearance of almost 3 percent. Hence, the promotional spending by the USHBC has clearly had a positive effect on domestic blueberry demand.

The results also indicated that generic blueberry promotion by the USHBC had a positive impact on the blueberry growers' price over this period. The average increase in price ranged from 2.3 cents per pound, in the case of the least elastic supply response, to 0.8 cents per pound, in the case of the most elastic supply response. The average

impact over all supply responses was 1.4 cents per pound. In other words, had there not been generic blueberry promotion by the USHBC, the average growers' price would have been 1.4 cents per pound, or 1.8 percent, lower from 2001 to 2004 than it actually was.

USHBC promotion efforts had a positive impact on producer surplus (i.e., producer profits) over this period as well. The average increase in producer surplus due to generic blueberry promotion by the USHBC ranged from \$7.4 million per year, in the case of the least elastic supply response, to \$2.5 million per year, in the case of the most elastic supply response. The average increase in producer surplus over all supply responses was \$4.4 million per year. Hence, it is clear that domestic promotion efforts of the USHBC has had a positive impact on growers' profits since 2001.

An average BCR was computed for the generic promotion activities of the USHBC, and the BCR exceeded 1.0 for every supply response considered in the simulation. For the least elastic supply response, the average BCR was 13.22. This implies that, on average over the period 2001-2004, the benefits of the USHBC promotion programs have been over 13 times greater than the costs. At the opposite end of the spectrum in supply response, the average BCR was computed to be 4.46, implying that the benefits of the USHBC were over four times greater than the costs. Given the wide range of supply responses considered in this analysis, and the fact that the BCR was above 1.0 in all cases, there is significant

evidence that the USHBC's promotion programs have been profitable for the domestic blueberry industry. The average BCR over all supply responses was 7.86, i.e., the benefits of the promotion activities of the USHBC exceeded the costs by almost eight-fold.

To make allowances for the error inherent in any statistical estimation, a 95 percent confidence interval was calculated for the above average BCRs. The confidence interval provides a lower bound for the average BCR that one can be "confident" 95 percent of the time the true average BCR is not below. The estimated lower bound for the average BCR for the lowest assumed supply response for the period 2001-2004 was 3.67. This result demonstrates that one could be confident 95 percent of the time that the true average BCR for this assumed supply response is not lower than 3.67. The lower 95 percent confidence bound for the average BCR in the highest assumed supply response for the period 2001-2004 was 1.23. (It is important to remember that the average BCR was above 1.0 for all assumed supply responses.) Hence, it is reasonable to conclude that the above confidence intervals give credence to the previous finding that the benefits of the USHBC's promotion programs have been considerably greater than their cost.

Figure 1. U.S. per capita blueberry consumption, 1976-2004

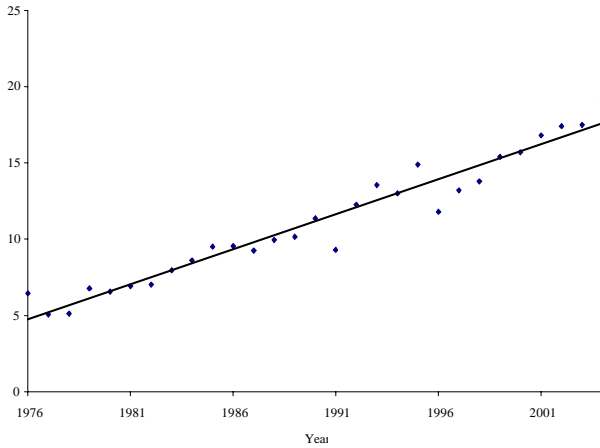


Figure 2. Real (inflation-adjusted) grower blueberry price (\$/lb), 1976-2004

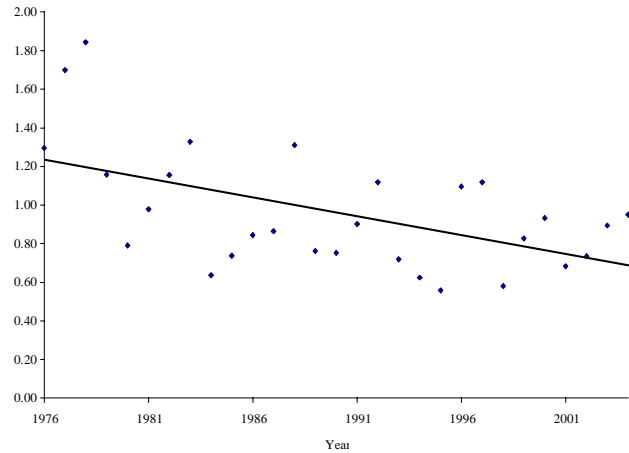


Figure 3. U.S. real (inflation-adjusted) per capita disposable income, 1976-2004

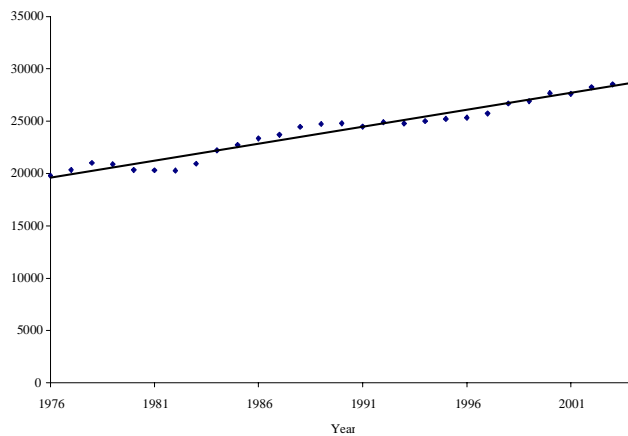
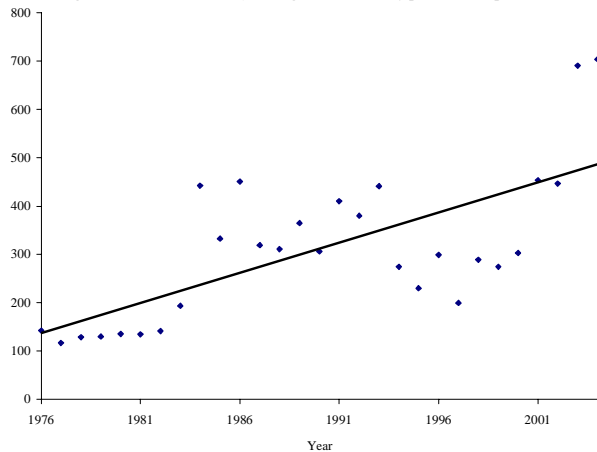


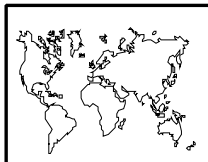
Figure 4. Real (inflation-adjusted) generic blueberry promotion expenditures, 1976-2004



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